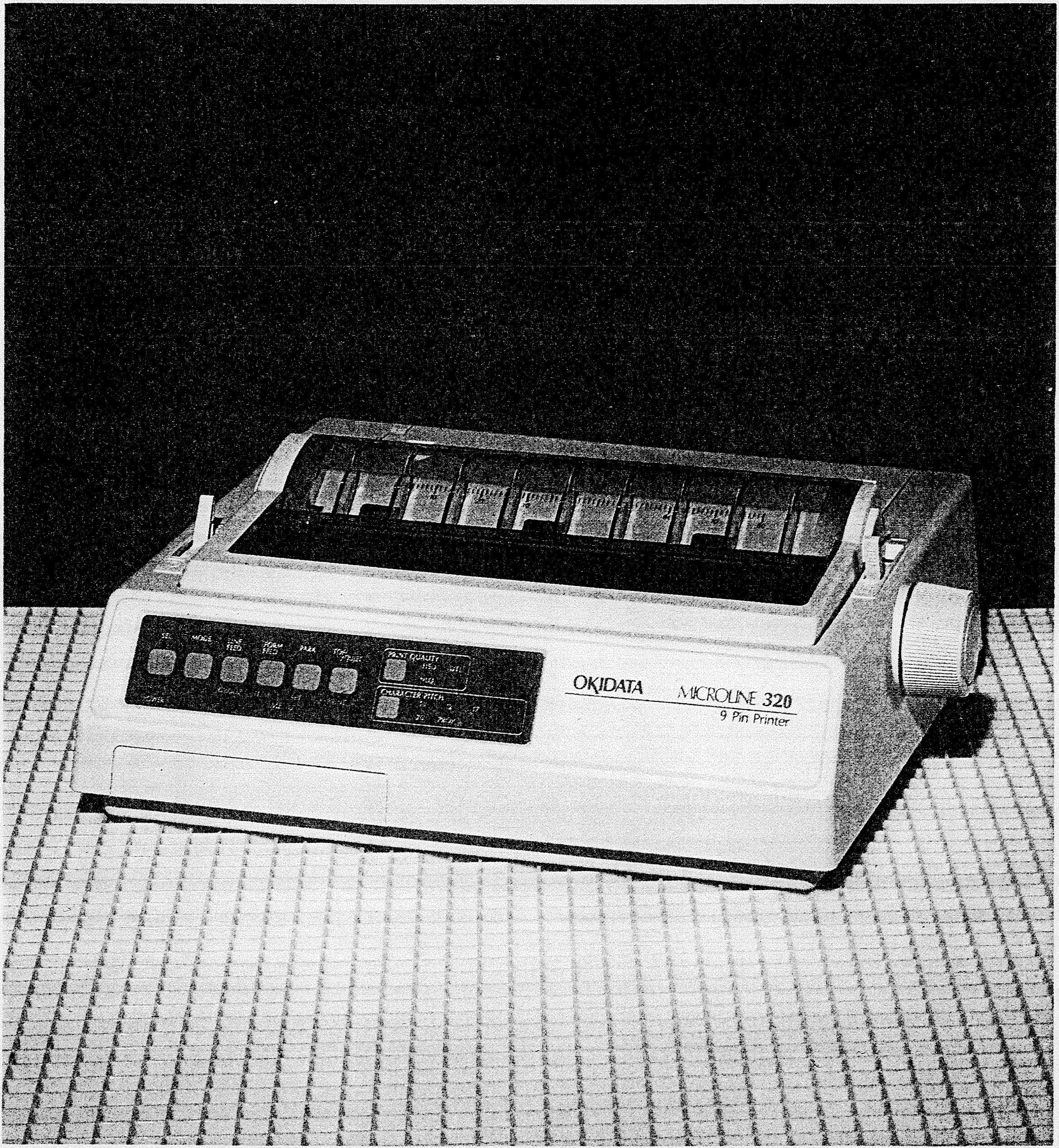
HOWARD W. SAMS & COMPANY CP60 09062

COMPUTERFACTS®

Technical Service Data

OKIDATA®
MODEL MICROLINE 320(GE5253A)
PRINTER



OKIDATA
MICROLINE 320
9 Pin Printer
SEL
MODE
LINE FEED
FORM FEED
PARK
PRINT QUALITY
CHARACTER PITCH

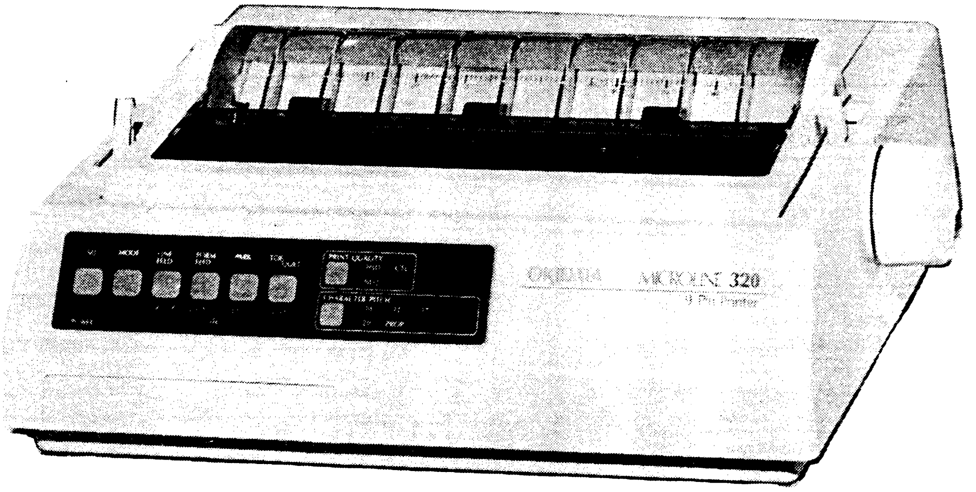
FEATURES COMPLETE SCHEMATICS • PRELIMINARY SERVICE CHECKS • TROUBLESHOOTING TIPS • EASY-READ WAVEFORMS • REPLACEMENT PARTS LISTS • SEMICONDUCTOR CROSS-REFERENCE

C55

SAMS COMPUTERFACTS™

OKIDATA
MODEL MICROLINE 320(GE5253A

OKIDATA
MODEL MICROLINE 320(GE5253A)
CP60



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MODEL MICROLINE 320(GE5253A)
OKIDATA

SAFETY PRECAUTIONS

See Page 3

PRELIMINARY SERVICE CHECKS

ENCLOSED

INDEX

Page
Block Diagram 5
Computer Self-Tests and
Diagnostics 19,20
Disassembly Instructions 15
General Operating
Instructions 12,13,14
GridTrace Location Guide
Control Board 33
Main Board - Bottom 8,37
Main Board - Top 7,38
Power Supply Board 32
IC Pinouts and Terminal Guides 31
Line Definitions 40
Logic Charts 17,18
Miscellaneous Adjustments 16

Page
Parts list .... 21 thru 25
Photos
AC Input Board 27
Chassis - Overall View 26
Control Board 28,33
Main Board 7,8,9,10,11,34,35,
36,37,38
Power Supply Board 29,32
Space (Carriage) Motor Board 30
Safety Precautions 3
Schematics .... 2,4,6,39,41 thru 45
Power Supply 6,39
Schematic Notes 42
Test Equipment 19
Troubleshooting 20

SAMS™ **Howard W. Sams & Co.**
4300 West 62nd Street, P.O. Box 7092, Indianapolis, Indiana 46206 U.S.A.

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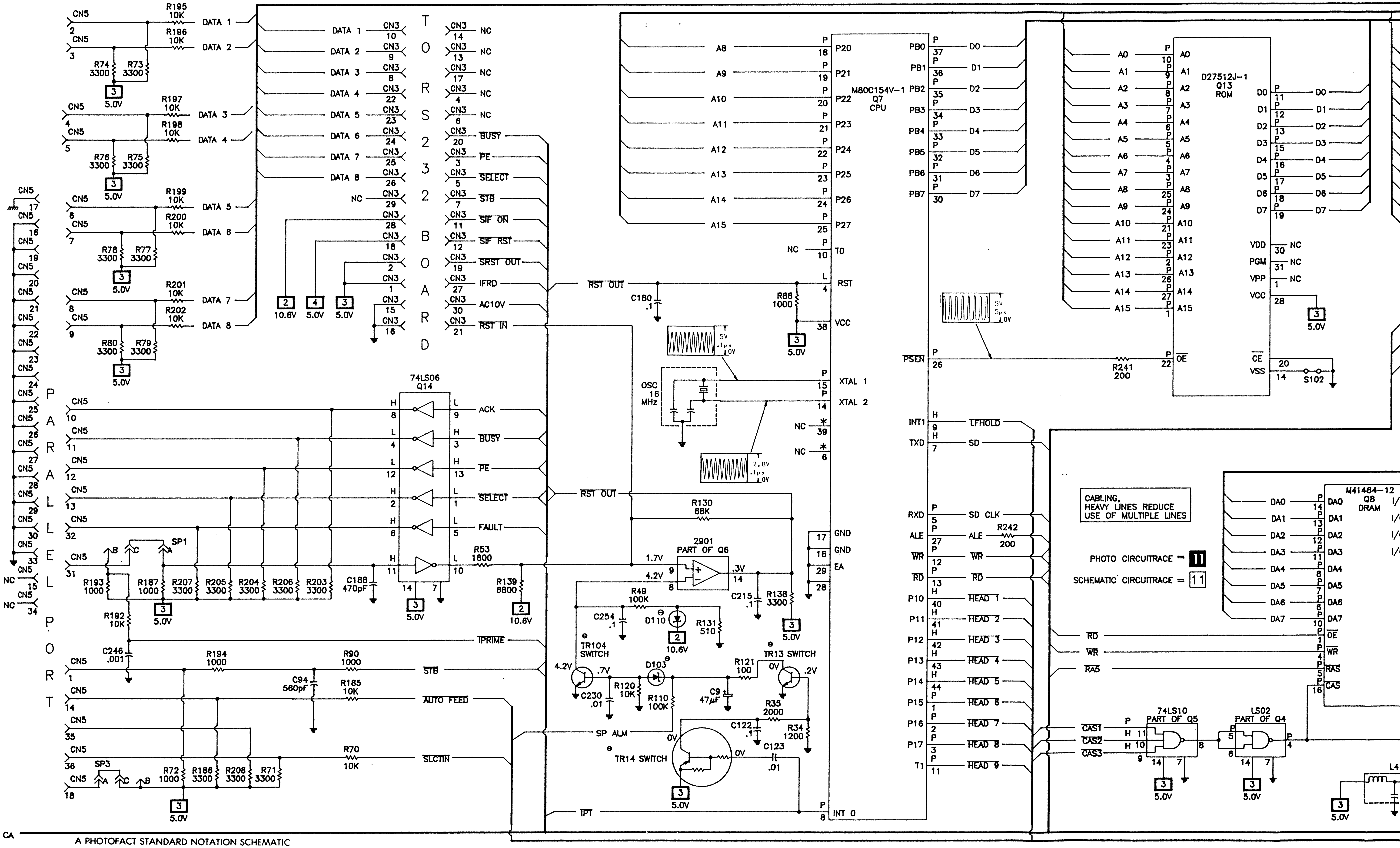
CN5
R195 10K
R196 10K
DATA 1
DATA 2
R74 3300
R73 3300
5.0V
R197 10K
R198 10K
DATA 3
DATA 4
R76 3300
R75 3300
R199 10K
R200 10K
DATA 5
DATA 6
R78 3300
R77 3300
R201 10K
R202 10K
DATA 7
DATA 8
R80 3300
R79 3300
PARALLEL PORT
TO RS232 BOARD
CN3
NC
BUSY
PE
SELECT
STB
SIF ON
SIF RST
SRST OUT
IFRD
AC10V
RST IN
10.6V
74LS06 Q14
ACK
FAULT
R53 1800
C188 470pF
R139 6800
SP1
R193 1000
R187 1000
R207 3300
R205 3300
R204 3300
R206 3300
R203 3300
R192 10K
C246 .001
IPRIME
R194 1000
R90 1000
C94 560pF
R185 10K
AUTO FEED
SLCTIN
R70 10K
SP3
R72 1000
R186 3300
R208 3300
R71 3300
RST OUT
C180 .1
R88 1000
OSC 16 MHz
XTAL 1
XTAL 2
M80C154V-1 Q7 CPU
A8
A9
A10
A11
A12
A13
A14
A15
P20
P21
P22
P23
P24
P25
P26
P27
T0
RST
VCC
GND
EA
INT 0
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
D0
D1
D2
D3
D4
D5
D6
D7
PSEN
INT1
TXD
RXD
ALE
WR
RD
P10
P11
P12
P13
P14
P15
P16
P17
T1
LFHOLD
SD
SD CLK
R242 200
HEAD 1
HEAD 2
HEAD 3
HEAD 4
HEAD 5
HEAD 6
HEAD 7
HEAD 8
HEAD 9
R130 68K
2901 PART OF Q6
1.7V
4.2V
.3V
C215 .1
R138 3300
R49 100K
C254 .1
D110
R131 510
TR104 SWITCH
TR13 SWITCH
C230 .01
D103
R120 10K
R110 100K
R121 100
C9 47µF
R35 2000
C122 .1
R34 1200
C123 .01
SP ALM
TR14 SWITCH
IPT
D27512J-1 Q13 ROM
A0
A1
A2
A3
A4
A5
A6
A7
VDD
PGM
VPP
VCC
OE
CE
VSS
R241 200
S102
5V 5µs 0V
5V .1µs 0V
2.8V .1µs 0V
CABLING, HEAVY LINES REDUCE USE OF MULTIPLE LINES
PHOTO CIRCUITRACE = 11
SCHEMATIC CIRCUITRACE = 11
M41464-12 Q8 DRAM
DA0
DA1
DA2
DA3
DA4
DA5
DA6
DA7
RAS
CAS
CAS1
CAS2
CAS3
74LS10 PART OF Q5
LS02 PART OF Q4
L4

CA

A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE

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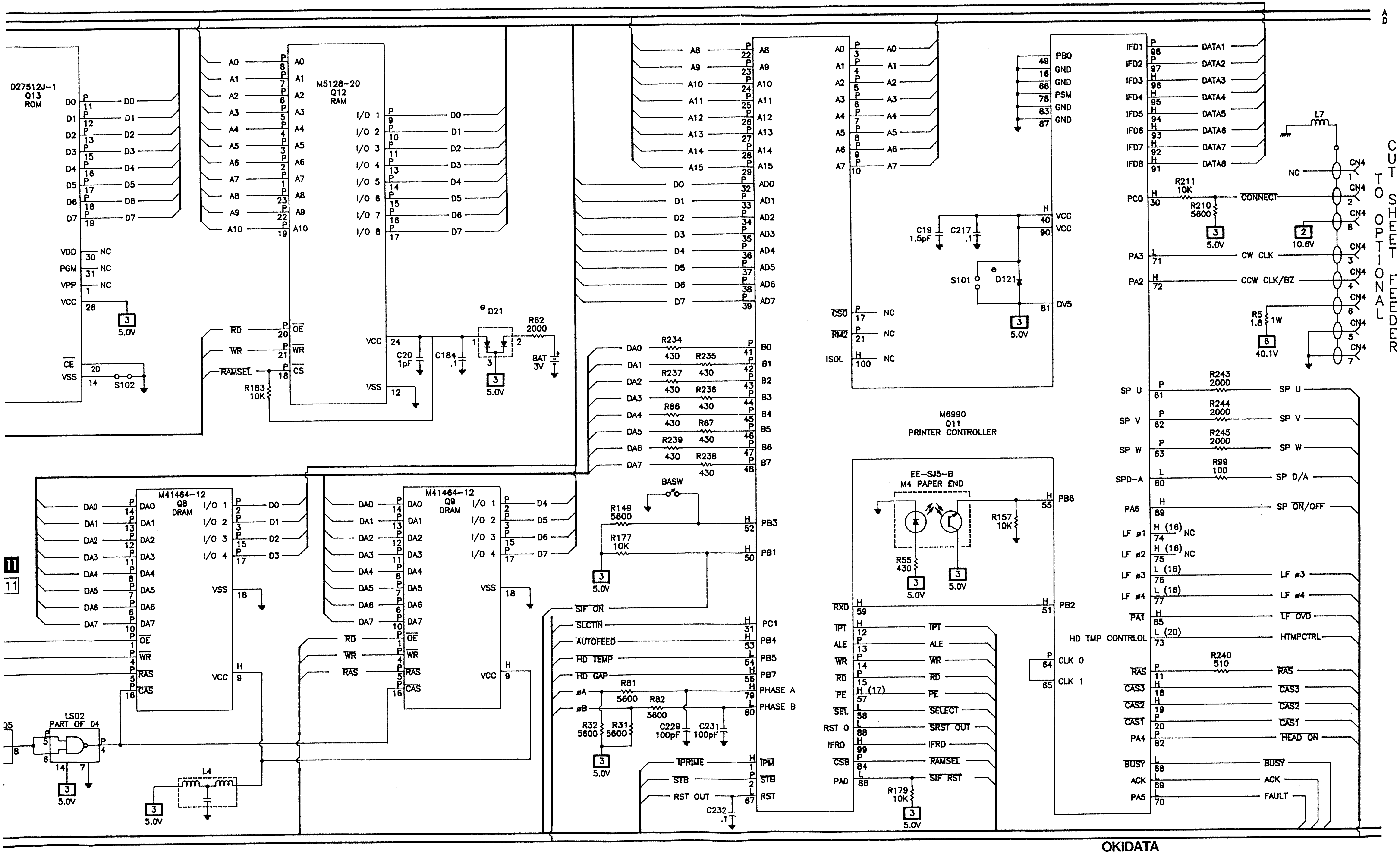
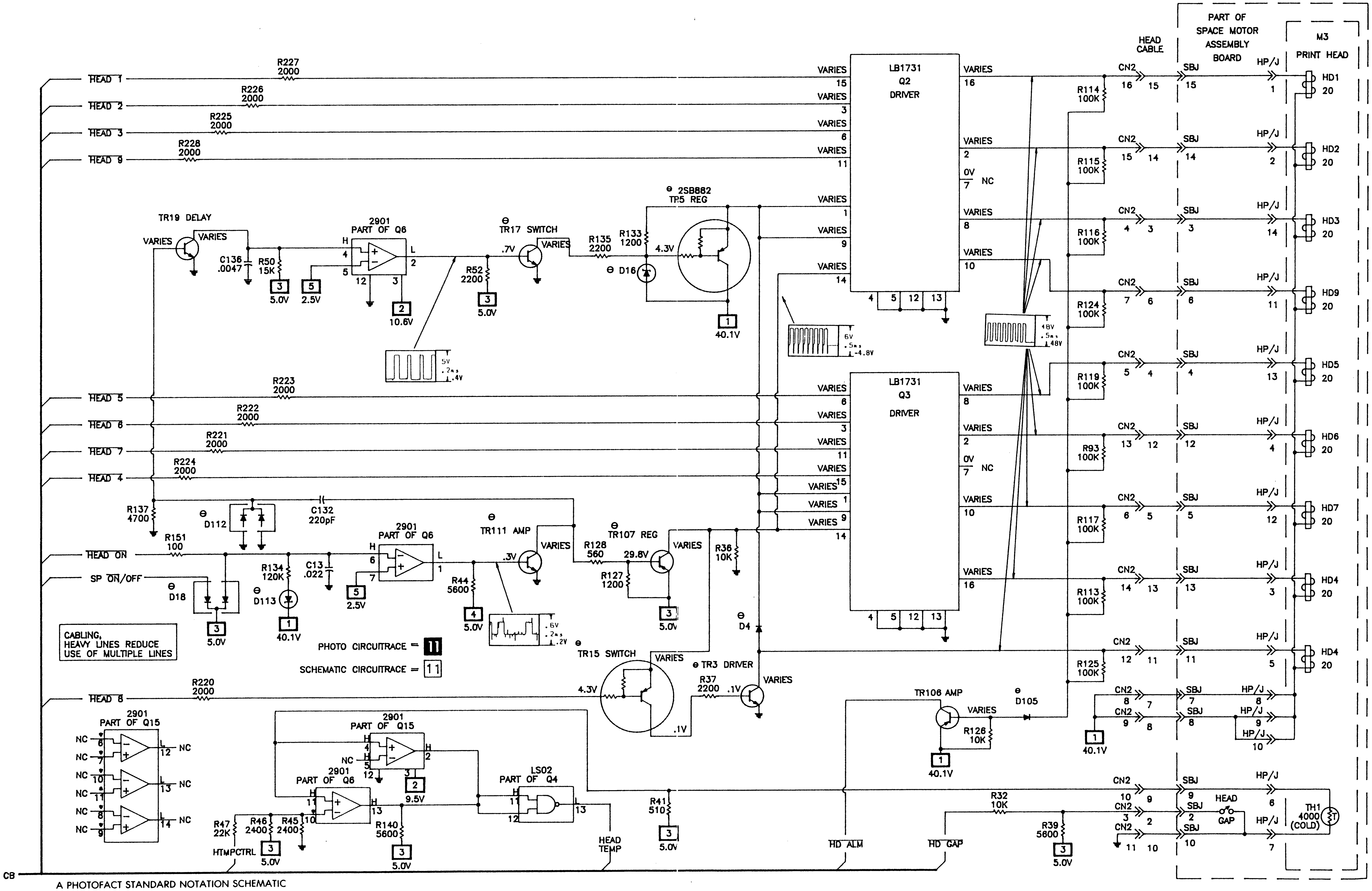

D27512J-1
Q13
ROM
D0
D1
D2
D3
D4
D5
D6
D7
VDD
PGM
VPP
VCC
CE
VSS
S102
NC
5.0V
M5128-20
Q12
RAM
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
I/O 1
I/O 2
I/O 3
I/O 4
I/O 5
I/O 6
I/O 7
I/O 8
RD
WR
RAMSEL
OE
CS
R183
10K
VCC
VSS
C20
1pF
C184
.1
D21
R62
2000
BAT
3V
A11
A12
A13
A14
A15
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
DA0
DA1
DA2
DA3
DA4
DA5
DA6
DA7
R234
R235
R237
R236
R86
R87
R239
R238
430
B0
B1
B2
B3
B4
B5
B6
B7
BASW
R149
5600
R177
10K
PB3
PB1
SIF ON
SLCTIN
AUTOFEED
HD TEMP
HD GAP
øA
øB
R81
R82
R32
R31
C229
100pF
C231
100pF
PC1
PB4
PB5
PB7
PHASE A
PHASE B
TPRIME
STB
RST OUT
C232
.1
IPM
RST
CS0
RM2
ISOL
M6990
Q11
PRINTER CONTROLLER
PB0
GND
PSM
VCC
DV5
C19
1.5pF
C217
.1
S101
D121
EE-SJ5-B
M4 PAPER END
R55
430
R157
10K
PB6
PB2
RXD
TPT
ALE
PE
SEL
RST O
IFRD
CSB
PA0
SELECT
SRST OUT
RAMSEL
SIF RST
R179
10K
CLK 0
CLK 1
IFD1
IFD2
IFD3
IFD4
IFD5
IFD6
IFD7
IFD8
DATA1
DATA2
DATA3
DATA4
DATA5
DATA6
DATA7
DATA8
L7
NC
CN4
PC0
R211
10K
R210
5600
CONNECT
10.6V
PA3
PA2
CW CLK
CCW CLK/BZ
R5
1.8
1W
40.1V
TO OPTIONAL CUT SHEET FEEDER
SP U
SP V
SP W
SPD-A
PA6
R243
R244
R245
2000
R99
100
SP D/A
SP ON/OFF
LF ø1
LF ø2
LF ø3
LF ø4
PA1
LF OVD
HD TMP CONTROL
HTMPCTRL
R240
510
RAS
CAS3
CAS2
CAS1
PA4
HEAD ON
BUSY
ACK
PA5
FAULT
M41464-12
Q8
DRAM
Q9
VSS
VCC
CAS
LS02
PART OF Q4
L4
11
A
D

OKIDATA
MODEL MICROLINE 320(GE5253A)


HEAD 1
R227 2000
HEAD 2
R226 2000
HEAD 3
R225 2000
HEAD 9
R228 2000
TR19 DELAY
VARIES
C136 .0047
R50 15K
5.0V
2.5V
2901 PART OF Q6
10.6V
TR17 SWITCH
.7V
R52 2200
R135 2200
R133 1200
2SB882 TP5 REG
4.3V
D16
40.1V
LB1731 Q2 DRIVER
LB1731 Q3 DRIVER
0V 7 NC
HEAD 5
R223 2000
HEAD 6
R222 2000
HEAD 7
R221 2000
HEAD 4
R224 2000
R137 4700
D112
C132 220pF
HEAD ON
R151 100
SP ON/OFF
D18
R134 120K
D113
C13 .022
TR111 AMP
.3V
R44 5600
R128 560
TR107 REG
29.8V
R127 1200
R36 10K
D4
CABLING, HEAVY LINES REDUCE USE OF MULTIPLE LINES
PHOTO CIRCUITRACE = 11
SCHEMATIC CIRCUITRACE = 11
TR15 SWITCH
TR3 DRIVER
R37 2200
.1V
HEAD 8
R220 2000
2901 PART OF Q15
NC
R47 22K
R46 2400
R45 2400
HTMPCTRL
R140 5600
9.5V
LS02 PART OF Q4
HEAD TEMP
R41 510
TR106 AMP
R126 10K
D105
HD ALM
HD GAP
R32 10K
R39 5600
HEAD CABLE
PART OF SPACE MOTOR ASSEMBLY BOARD
M3 PRINT HEAD
CN2
SBJ
HP/J
R114 100K
R115 100K
R116 100K
R124 100K
R119 100K
R93 100K
R117 100K
R113 100K
R125 100K
HD1
HD2
HD3
HD9
HD5
HD6
HD7
HD4
HEAD GAP
TH1 4000 (COLD)
CB

A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE™

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OKIDATA
MODEL MICROLINE 320(GE5253A)

SCHEMATIC NOTES

—•— Circuitry not used in some versions
--- Circuitry used in some versions
• See parts list
+ Ground
⏚ Chassis
∇ Common tie point

Waveforms and voltages taken from ground, unless noted otherwise.

Item numbers in rectangles appear in the alignment/adjustment instructions.

Resistors are 1/2W or less, 5% unless noted.

Value in ( ) used in some versions.

Measurements with switching as shown, unless noted.

Supply voltage maintained as shown at input.

Voltages measured with digital meter.

Logic Probe Display
L = Low
H = High
P = Pulse
* = Open (no lights On)

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

Capacitors are 50 volts or less, 5% unless noted.

Electrolytic Capacitors are 50 volts or less, 5% unless noted.

Waveforms taken with triggered scope and Sweep/Time switch in Calibrate position, scope input set for DC coupling on 0 reference voltage waveforms. Switch to AC input to view waveforms after DC reference is measured when necessary. Each waveform is 10cm. width with DC reference voltage given at the bottom line of each waveform.

Logic Probe Indicates:

(1) L during Line Feed.
(2) H during Line Feed.
(3) P during Line Feed.
(4) L when Carriage Assembly reaches either end.
(5) H when Carriage Assembly reaches either end.
(6) P when Carriage Assembly reaches either end.
(7) L when Printer is On Line.
(8) H when Printer is On Line.
(9) P when Printer is On Line.
(10) L when Carriage Assembly is in Home position.
(11) H when Carriage Assembly is in Home position.
(12) P when Carriage Assembly is in Home position.
(13) P when Print Head changes direction.
(14) L when FF button is pressed.
(15) H when FF button is pressed.
(16) P when FF button is pressed.
(17) L when paper end is activated.
(18) H when paper end is activated.
(19) P when paper end is activated.
(20) H when Print Head is too hot.
(21) High when HSD led is On.
(22) Low when HSD led is On.
(23) High when UTIL led is On.
(24) Low when UTIL led is On.
(25) High when ALARM is On.
(26) Low when ALARM is On.
(27) High when SEL is On.
(28) Low when SEL is On.
(29) Low when attached LED is ON.

SAFETY PRECAUTIONS

1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the Printer before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductor "chip" components.
4. Use extreme caution when handling the printed circuit boards. Some semiconductor devices can be damaged easily by static electricity. Drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available discharging wrist strap device. This should be removed prior to applying power to the unit under test.
5. Use a grounded-tip, low voltage soldering iron.
6. Use an isolation (times 10) probe on scope.
7. Do not remove or install board, mechanical or electrical parts or other peripherals with Printer AC power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. This Printer is equipped with a grounded three-pronged AC plug. This plug must fit into a grounded AC power outlet. Do not defeat the AC plug safety feature.
10. Periodically examine the AC power cord for damaged or cracked insulation.
11. The Printer cabinet is equipped with vents to prevent heat build-up. Never block, cover or obstruct these vents.
12. Instructions should be given, especially to children, that objects should not be dropped or pushed into the vents of the cabinet. This could cause shock or equipment damage.
13. Never expose the Printer to water. If exposed to water, turn the unit Off. Do not place the Printer near possible water sources.
14. Never leave the Printer unattended or plugged into the AC outlet for long periods of time. Remove AC plug from AC outlet during lightning storms.
15. Do not allow anything to rest on AC power cord.
16. Unplug AC power cord from outlet before cleaning Printer.
17. Never use liquids or aerosols directly on the Printer. Spray on cloth and then apply to the Printer cabinet. Make sure the Printer is disconnected from the AC power line.

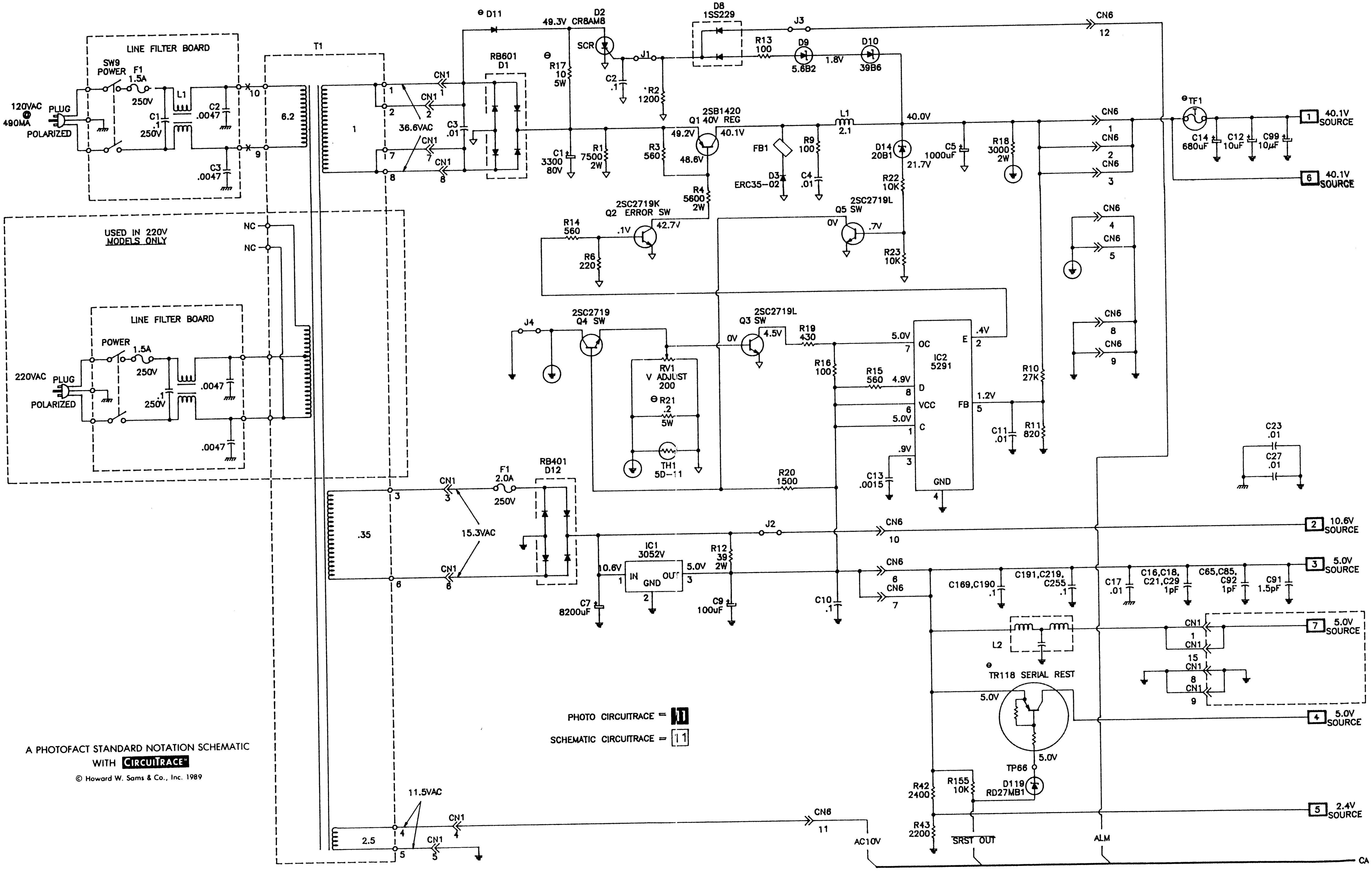
LINE FILTER BOARD
SW9 POWER
F1 1.5A 250V
120VAC 490MA PLUG POLARIZED
L1
C1 .1 250V
C2 .0047
C3 .0047
10
9
T1
6.2
1
USED IN 220V MODELS ONLY
NC
NC
LINE FILTER BOARD
POWER
1.5A 250V
220VAC PLUG POLARIZED
.1 250V
.0047
.0047
CN1
36.6VAC
C3 .01
RB601 D1
D11
49.3V CR8AM8
D2 SCR
R17 10 5W
C2 .1
J1
R2 1200
D8 1SS229
J3
R13 100
D9 5.6B2
1.8V
D10 39B6
CN6 12
C1 3300 80V
R1 7500 2W
R3 560
2SB1420 Q1 40V REG
49.2V
48.6V
40.1V
L1 2.1
40.0V
FB1
D3 ERC35-02
R9 100
C4 .01
D14 20B1
21.7V
C5 1000uF
R18 3000 2W
R22 10K
R4 5600 2W
2SC2719K Q2 ERROR SW
42.7V
.1V
R14 560
R6 220
2SC2719L Q5 SW
0V
.7V
R23 10K
CN6 1 2 3 4 5 8 9
TF1
C14 680uF
C12 10uF
C99 10µF
1 40.1V SOURCE
6 40.1V SOURCE
J4
2SC2719 Q4 SW
RV1 V ADJUST 200
R21 .2 5W
TH1 5D-11
2SC2719L Q3 SW
0V
4.5V
R19 430
R16 100
R15 560
5.0V
4.9V
IC2 5291
OC 7
D 8
VCC 6
C 1
E 2
FB 5
GND 4
.4V
1.2V
.9V 3
R10 27K
R11 820
C11 .01
C13 .0015
R20 1500
C23 .01
C27 .01
CN1 3
F1 2.0A 250V
RB401 D12
.35
15.3VAC
CN1 6
J2
CN6 10
2 10.6V SOURCE
IC1 3052V
10.6V
IN GND OUT
5.0V
R12 39 2W
C7 8200uF
C9 100uF
C10 .1
CN6 6 7
C169,C190 .1
C191,C219, C255 .1
C17 .01
C16,C18, C21,C29 1pF
C65,C85, C92 1pF
C91 1.5pF
3 5.0V SOURCE
L2
CN1 1 15 8 9
7 5.0V SOURCE
TR118 SERIAL REST
5.0V
TP66
D119 RD27MB1
R155 10K
4 5.0V SOURCE
R42 2400
R43 2200
SRST OUT
5 2.4V SOURCE
11.5VAC
2.5
CN1 4 5
CN6 11
AC10V
ALM
CA

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PHOTO CIRCUITRACE = 11

SCHEMATIC CIRCUITRACE = 11

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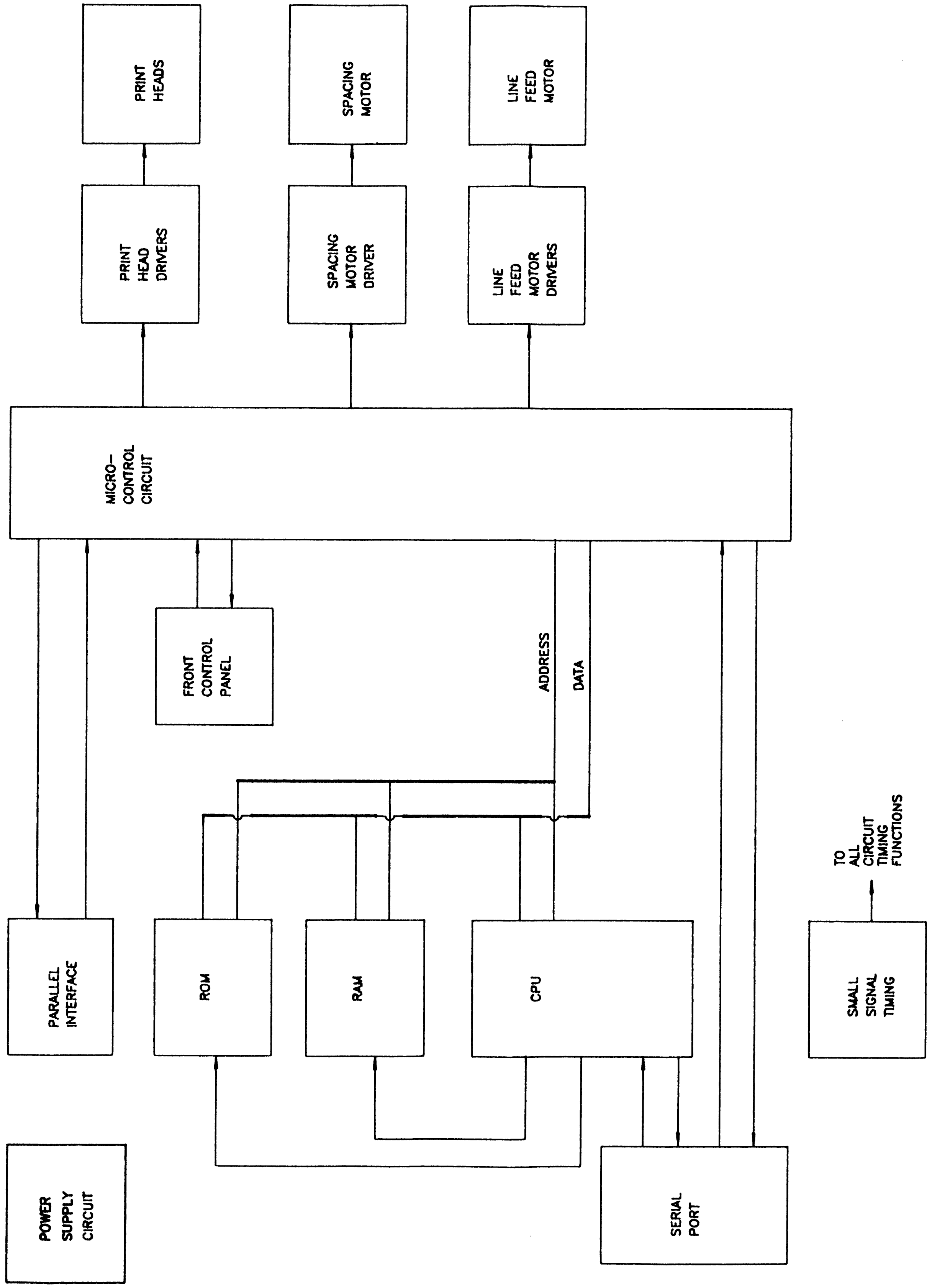
MODEL MICROLINE 320(GE5253A)

LINE DEFINITIONS

AO TO A15	ADDRESS 0 TO ADDRESS 15
ACK	ACKNOWLEDGE
AC10V	10VAC TO RS232 INTERFACE
ALE	ADDRESS LATCH ENABLE
ALM	ALARM
AUTOFEED	AUTOMATIC SHEET FEED
BUSY	BUSY
CLK	CLOCK
CVR OPEN	COVER OPEN
DO TO D7	DATA0 TO DATA7
DATA IN	SERIAL INTERFACE DATA IN
DATA OUT	SERIAL INTERFACE DATA OUT
DATA1 TO DATA8	PARALLEL INTERFACE DATA1 TO DATA8
FAULT	FAULT
HD ALM	HEAD ALARM
HEAD ON	HEAD ENABLE
HEAD1 TO HEAD9	HEAD DATA1 TO HEAD DATA9
HEADTEMP	HEAD TEMPERATURE
IFRD	READ RS232 INTERFACE
IPT	INTERRUPT O
ISOL	ISOLATED GROUND TO RS232 INTERFACE
LAMP SEL	PANEL LAMP SELECT
LF ALM	LINE FEED MOTOR ALARM
OA	MOTOR PHASE A
OB	MOTOR PHASE B
PE	PAPER EMPTY
RAMSEL	RAM SELECT
RD	READ
RSTOUT	RESET OUT
RXD	RECEIVE DATA
SELECT	ONLINE OUT
SLCTIN	SELECT INPUT
SP ALM	SPACING MOTOR ALARM
SP ON/OFF	SPACING MOTOR LOW - ON, HIGH - OFF
STB	STROBE
SW DATA	ATTENTION FROM RS232 INTERFACE
SW SEL	PANEL SWITCH SELECT
SW1 TO SW3	SWITCH DATA1 TO SWITCH DATA3
WR	WRITE

BLOCK DIAGRAM


PRINT HEADS
SPACING MOTOR
LINE FEED MOTOR
PRINT HEAD DRIVERS
SPACING MOTOR DRIVER
LINE FEED MOTOR DRIVERS
MICRO-CONTROL CIRCUIT
FRONT CONTROL PANEL
ADDRESS
DATA
TO ALL CIRCUIT TIMING FUNCTIONS
PARALLEL INTERFACE
ROM
RAM
CPU
SMALL SIGNAL TIMING
POWER SUPPLY CIRCUIT
SERIAL PORT

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MODEL MICROLINE 320(GE5253A)

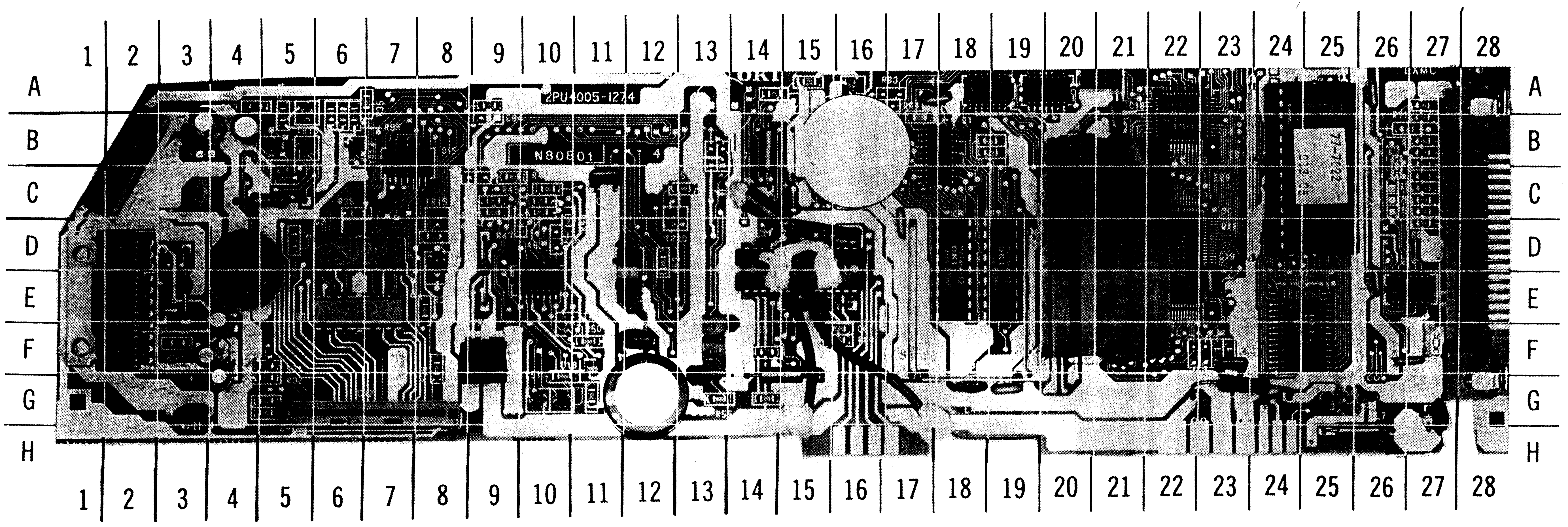
MAIN BOARD - TOP-GridTrace LOCATION GUIDE

BA SW	E-12
BAT	B-16
C8	B-4
C9	B-3
C10	E-4
C11	F-3
C12	G-4
C13	F-12
C14	G-12
C16	D-17
C17	G-3
C18	B-21
C19	E-23
C20	E-26
C21	A-26
C23	G-27
C27	A-28
C29	C-11
C59	F-14
C61	F-16
C65	G-19
C83	A-9
C85	A-17
C89	B-17
C91	F-23
C92	F-27
C94	F-23
C99	C-14
CN1	B-2
CN2	G-8
CN3	B-20
CN5	B-28
CN6	H-22
CN7	H-16
D2	E-3
D4	D-9
D10	B-5
D12	B-5
D16	G-10
D18	F-11
D21	A-16
IC1	F-2
L1	D-4
L2	B-3
L3	B-14
L4	G-18
L5	G-14
L7	H-26
M4	F-3
OSC	A-21
Q1	B-17
Q2	D-6
Q3	F-6
Q4	A-18
Q5	A-19
Q6	E-10
Q7	A-22
Q8	D-18
Q9	D-18
Q10	E-14
Q11	E-23
Q12	E-24
Q13	A-24
Q14	E-26
Q15	C-7
R1	E-3
R2	C-5
R3	D-15
R4	E-15
R5	G-23
R30	F-3
R31	F-5
R32	G-5
R33	A-4
R34	A-5
R35	A-7
R36	C-6
R37	D-8
R38	E-8
R39	F-8
R41	C-9
R42	C-9
R43	C-9
R44	C-10
R45	C-10
R46	C-10
R47	D-9
R49	D-10
R50	F-11
R51	G-10
R52	G-11
R53	D-12
R54	C-13
R55	G-13
R58	G-14
R60	F-16
R62	A-15
R70	A-27
R71	B-27
R72	B-27
R73	B-27
R74	B-27
R75	B-27
R76	C-27
R77	C-27
R78	C-27
R79	C-27
R80	D-27
R81	G-5
R82	G-5
R86	B-19
R87	B-19
R88	B-20
R90	F-23
R93	D-5
R99	A-14
SP1	B-26
SP3	F-22
TF1	D-15
TR1	E-1
TR3	D-8
TR5	F-9
TR11	C-5
TR13	B-5
TR14	B-6
TR15	C-8
TR17	G-10
TR19	F-10
TR20	D-12

CP60

OKIDATA

MODEL MICROLINE 320(GE5253A)



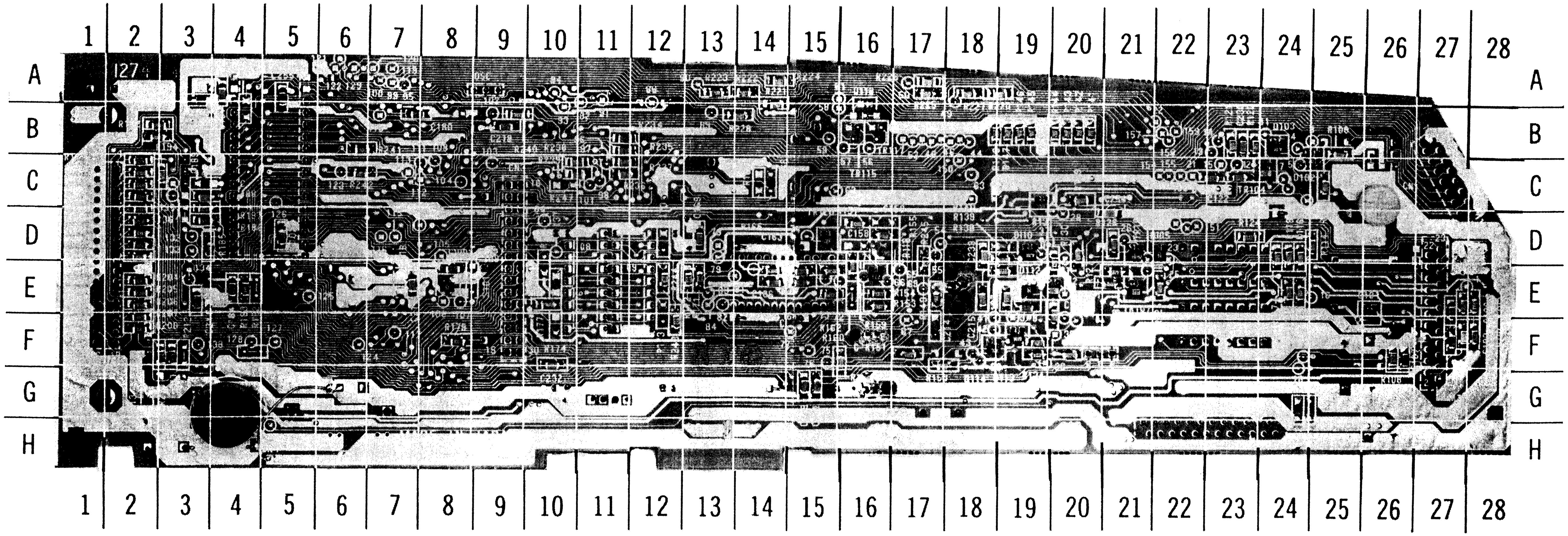
MAIN BOARD - TOP

A Howard W. Sams GRIDTRACE™ Photo

MAIN BOARD - TOP

MAIN BOARD - BOTTOM-GridTrace LOCATION GUIDE

C102	F-27
C103	F-27
C107	F-26
C122	C-23
C123	C-23
C132	F-20
C136	E-19
C163	E-19
C164	E-15
C166	E-14
C169	D-13
C180	B-7
C184	E-4
C188	C-3
C190	E-8
C191	A-4
C215	E-18
C217	E-7
C219	B-9
C229	G-15
C230	B-23
C231	G-15
C232	G-10
C246	E-3
C254	C-20
C255	A-5
CN4	H-4
D101	E-26
D102	C-25
D103	B-24
D105	D-22
D110	D-19
D112	E-19
D113	F-19
D114	F-18
D119	E-16
D121	E-8
R101	F-28
R104	E-28
R105	E-27
R106	E-27
R108	F-26
R109	B-25
R110	C-25
R113	E-24
R114	D-25
R115	E-24
R116	D-24
R117	D-24
R119	D-24
R120	B-23
R121	B-23
R124	D-23
R125	E-22
R126	D-21
R127	E-21
R128	E-21
R129	C-20
R130	D-20
R131	E-20
R133	F-20
R134	F-19
R135	F-19
R137	D-19
R138	E-19
R139	D-19
R140	D-19
R141	B-20
R142	B-20
R143	B-20
R144	B-20
R145	B-19
R146	B-19
R147	B-19
R148	B-19
R149	E-17
R150	G-18
R151	F-17
R152	F-16
R153	E-16
R154	E-16
R155	D-16
R157	D-16
R159	E-16
R161	E-15
R162	E-15
R165	E-14
R170	E-13
R171	E-13
R177	E-10
R179	F-8
R183	E-4
R185	D-3
R186	D-3
R187	D-3
R192	B-2
R193	B-2
R194	C-3
R195	C-2
R196	C-2
R197	C-2
R198	C-2
R199	D-2
R200	D-2
R201	D-2
R202	D-2
R203	D-2
R204	E-2
R205	E-2
R206	E-2
R207	F-2
R208	F-2
R210	F-3
R211	F-3
R220	A-19
R221	B-14
R222	A-14
R223	A-13
R224	A-14
R225	A-17
R226	A-17
R227	A-18
R228	B-14
R234	B-11
R235	B-11
R236	C-11
R237	C-11
R238	C-11
R239	C-11
R240	B-9
R241	B-6
R242	C-6
R243	F-12
R244	E-12
R245	D-17
S101	E-8
S102	D-5
TR104	C-24
TR106	D-21
TR107	E-21
TR109	C-19
TR111	E-20
TR118	D-16
TR120	D-15



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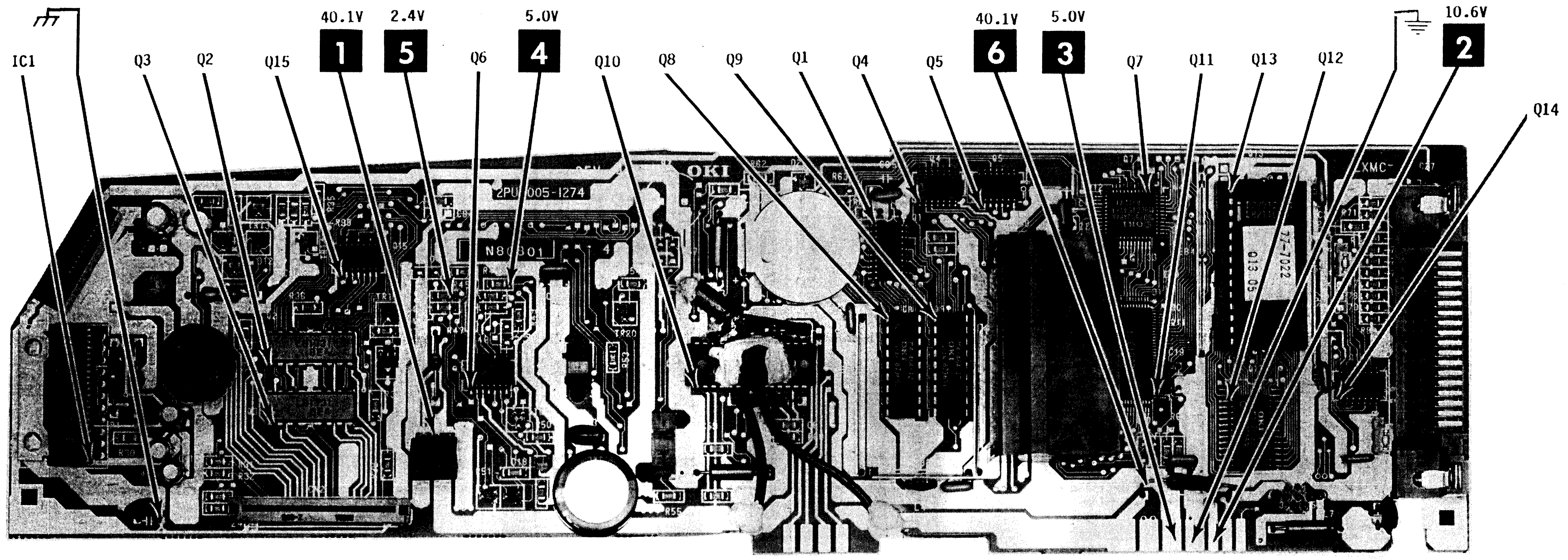
IC1
Q3
Q2
Q15
40.1V
1
2.4V
5
Q6
5.0V
4
Q10
Q8
Q9
Q1
Q4
Q5
40.1V
6
5.0V
3
Q7
Q11
Q13
Q12
10.6V
2
Q14
OKI
2PU005-1274

NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED

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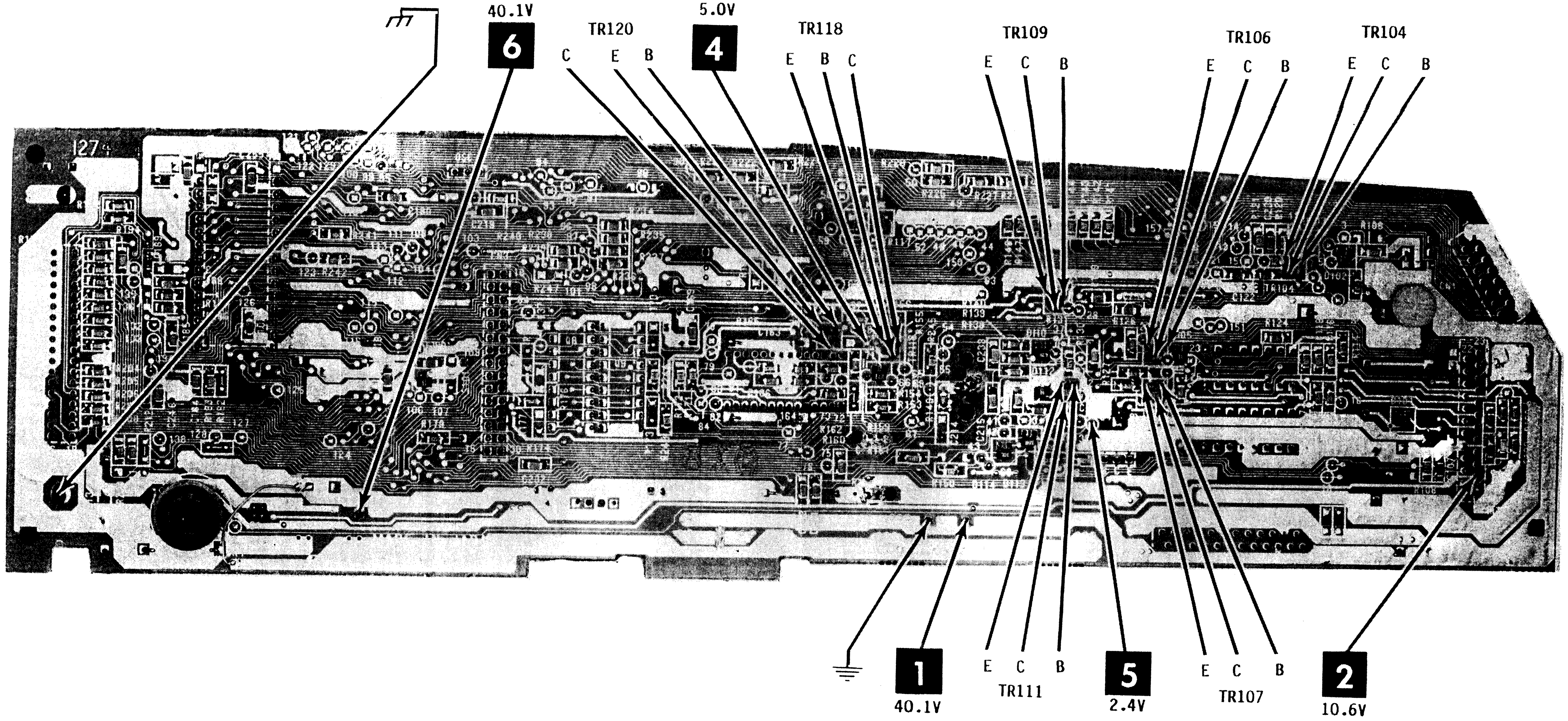
6
40.1V
TR120
C E B
4
5.0V
TR118
E B C
TR109
E C B
TR106
E C B
TR104
E C B
1
40.1V
E C B
TR111
5
2.4V
E C B
TR107
2
10.6V

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MODEL MICROLINE 320(GE5253A)

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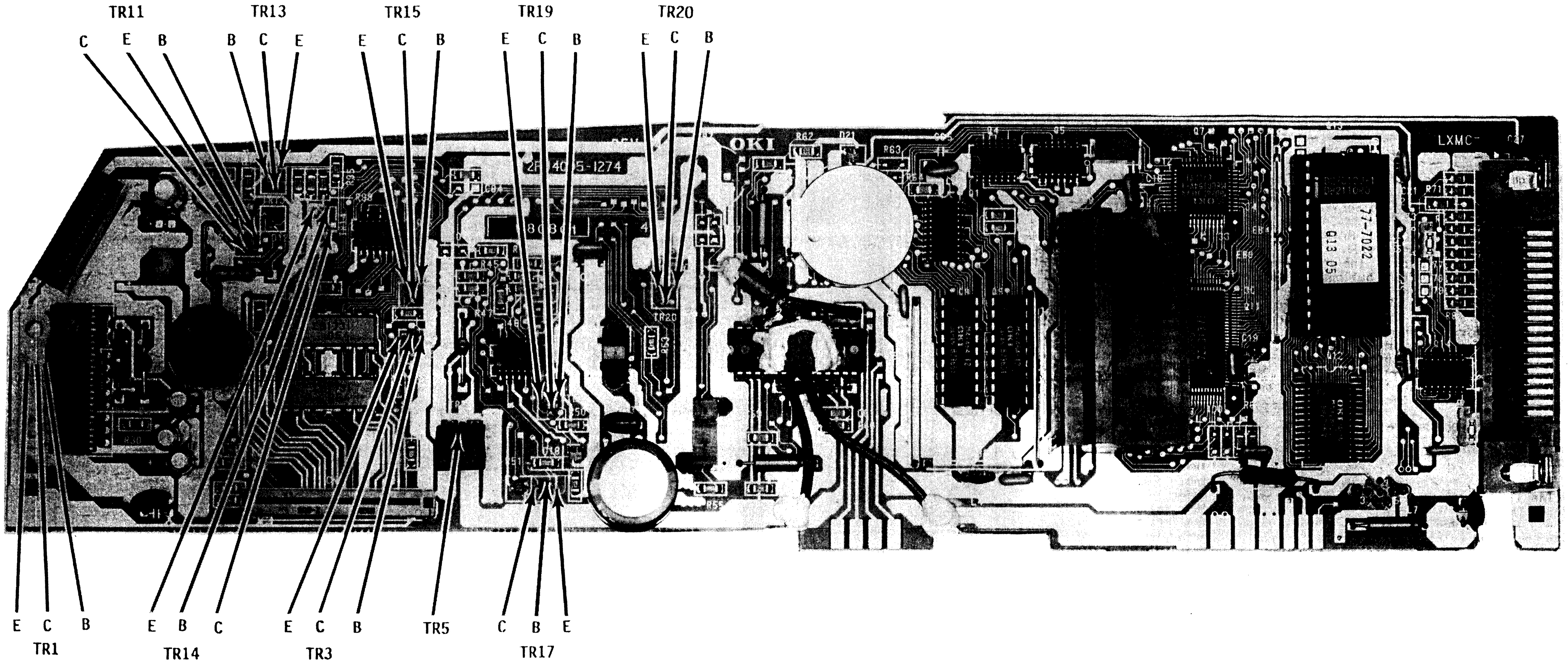
TR11
C
E
B
TR13
B
C
E
TR15
E
C
B
TR19
E
C
B
TR20
E
C
B
E
C
B
TR1
E
B
C
TR14
E
C
B
TR3
TR5
C
B
E
TR17
OKI
LXMC
77-7022

CP60

MODEL MICROLINE 320(GE5253A)

OKIDATA

MAIN BOARD - TOP

MAIN BOARD - TOP

GENERAL OPERATING INSTRUCTIONS

OPERATION OF THE CONTROL PANEL

The front Control Panel can be used to change the basic features of each document, and can alter the default settings. It also can be used to configure the printer for different computer systems.

BASIC CONTROLS

SEL Button	Push to select or de-select the printer.
SEL Light	The SEL Light will be On when the printer is selected and ready to receive data. The SEL Light is OFF when the printer is de-selected and cannot receive data.
Power Light	Indicates that the printer is turned On.
Alarm Light	Turns On when paper is out or when there may be a hardware problem requiring service.
Mode Button	Selects between Print Mode and Menu Select Mode. The mode button controls the functions of the next four buttons. Each of these buttons have two functions, one printed above the control and the other printed below the control. When the printer is in Print Mode the functions shown above the buttons are active. When the printer is in Menu Select Mode the functions below the buttons become active.

FUNCTIONS OF THE FOUR BUTTONS

PRINT MODE

1. Line Feed Button - Press to advance paper One line.
2. Form Feed Button - Press to advance paper to the first print line of the next page.
3. Park Button - This button is used to retract continuous forms to use the single sheet setting.
4. TOF/QUIET Button - With the printer de-selected press to set the position of the first print line on the page as "Top of Form." With the printer selected press to enter the Quiet Mode (Quiet light will turn On) to reduce noise.

PRINT QUALITY

Press the Print Quality button to select: HSD (High Speed Draft), NLQ (Near Letter Quality), or UTL (Utility). Respective indicator light will illiminate with selection.

CHARACTER PITCH

Press the Character Pitch button to select number of characters per inch. Select from 10, 12, 17, 20 or proportionally spaced characters. Proportionally spaced characters not functional while in Print Quality HSD mode. Respective indicator light will illuminate with selection.

MENU SELECT MODE

The selections on the menu can be stored in the printer memory and become the default settings, although they can be changed through software commands, control panel or resetting the menu. Respective indicator lights will illuminate with menu settings.

1. Group button - Press to select group of items.
2. Item button - Press to select item from selected group.
3. Set button - Press to set item from selected group.
4. Print button - Press to print full list of current menu settings.

MENU SELECTIONS FOR EPSON AND IBM MODELS

Group: Font

Item: Print Mode
Factory Setting: Utility
Other Settings: NLQ, HSD
Item: Pitch
Factory Setting: 10 CPI (Characters Per Inch)
Other Settings: 12 CPI, 17.1 CPI, 20 CPI, or Proportional.
Item: Style
Factory Setting: Normal
Other Settings: Italics
Item: Size
Factory Setting: Single
Other Settings: Double

Group: General Control

Item: Emulation Mode
Factory Setting: IBM PPR (Proprinter)
Other Setting: Epson FXe
Item: Bit Graphics
Factory Setting: Bidirectional
Other Setting: Unidirectional
Item: Paper Out Override
Factory Setting: No
Other Setting: Yes
Item: Print Registration
Factory Setting: 0
Other Settings: -1,-2,-3,-4,-5,-+5,4, +3,+2, or +1
Item: Operator Panel
Factory Setting: Full Operation
Other Setting: Limited
Item: Functions
Factory Setting: ----------
Other Setting: Operation

Group: Vertical Control

Item: Line Spacing
Factory Setting: 6 LPI (Lines Per Inch)
Other Setting: 8 LPI
Item: Form Tear Off
Factory Setting: Off
Other Setting: On
Item: Skip Over Performation
Factory Setting: No
Other Setting: Yes
Item: Auto LF (Line Feed)
Factory Setting: No
Other Setting: Yes
Item; Auto CR (Carriage Return)
Factory Setting: No
Other Setting: Yes
Item: Auto Feed XT

CP60

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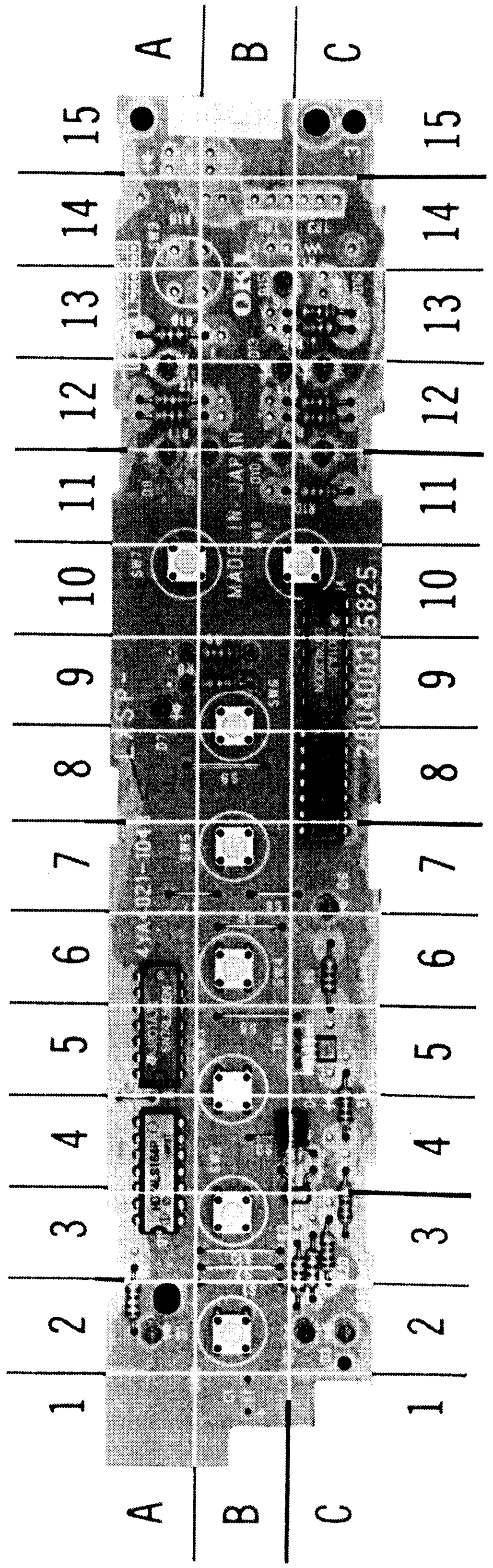
MODEL MICROLINE 320(GE5253A)



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CONTROL BOARD - GridTrace LOCATION GUIDE

C2	C-3	D13	B-12	R8	B-9	S5	B-5
C3	C-4	D14	C-12	R9	B-9	S6	B-6
CN1*	A-1	D15	B-13	R10	C-11	S9	B-8
D1	A-2	Q1	A-3	R11	A-12	SW1	B-2
D2	C-2	Q2	A-5	R12	A-12	SW2	B-3
D3	C-2	Q3	C-8	R13	C-12	SW3	B-5
D6	C-7	Q4	C-10	R14	C-12	SW4	B-6
D7	A-9	R1	A-2	R15	C-13	SW5	B-7
D8	A-11	R2	C-3	R16	C-13	SW6	B-9
D9	B-11	R3	C-3	R18	A-13	SW7	A-10
D10	B-11	R4	C-3	R20	C-3	SW8	C-10
D11	C-11	R5	C-4	S1	B-2	TR1	C-5
D12	A-12	R6	C-6	S2	B-3		

*Located on bottom of board

Other Setting: Yes
Item: Busy Line
Factory Setting: SSD-
Other Setting: SSD+, DTR, or RTS
Item: Baud Rate
Factory Setting: 9600 BPS (Bits Per Second)
Other Settings; 300, 600, 1200, 2400, 4800, or 19200 PBS
Item: DSR Signal
Factory Setting: Valid
Other Setting: Invalid
Item: DTR Signal
Factory Setting: Ready ON Power up
Other Setting: Ready On Select
Item Busy Time
Factory Setting: 200 Milliseconds
Other Setting: One Second

Factory Setting: Invalid
Other Setting: Valid
Item: Page Length
Factory Setting: 11 (Inches)
Other Settings: 11 2/3,12,14,3,3 1/2,4,
5 1/2,6,7,8, or 8 1/2 (Inches).

Group: Symbol Sets

Item: Character Set
Factory Setting: Set One
Other Setting: Set Two
Item: Language Set
Factory Setting: American
Other Settings: British, Danish One/Two,
Dutch,French, French Canadian,
German, Italian, Japanese,
Latin American, Norwegion,
Spanish One/Two, or Swedish
Item: Zero Character
Factory Setting: Slashed
Other Setting: Unslashed

Group: Serial Interface

Item: Parity
Factory Setting: None
Other Settings: Odd, or Even
Item: Serial Data
Factory Setting: 8 Bits
Other Setting: 7 Bits
Item: Protocol
Factory Setting: Ready/Busy
Other Setting: X-ON/X-Off
Item: Diagnostic Test
Factory Setting: No
Other Setting: Yes
Item: Bush Line
Factory Setting: SSD-
Other Setting: SSD+, DTR, or RTS
Item: Baud Rate
Factory Setting: 9600 BPS (Bits Per Second)
Other Settings: 300, 600, 1200, 2400, 4800,
or 19200 BPS
Item: DSR Signal
Factory Setting: Valid
Other Setting: Invalid
Item: DTR Signal
Factory Setting: Ready ON Power Up
Other Setting: Ready On Select
Item: Busy Time
Factory Setting: 200 Milliseconds
Other Setting: One Second

Menu Selections for Microline Standard Models

Group: Font

Item: Print Mode
Factory Setting: Utility
Other Settings: NLQ, HSD
Item: Pitch
Factory Setting: 10 CPI (Characters Per Inch)
Other Settings: 12 CPI, 17.1 CPI, or 20 CPI
Item: Proportional Spacing
Factory Setting: No
Other Setting: Yes
Item: Style
Factory Setting: Normal
Other Settings: Italics
Item: Size
Factory Setting: Single
Other Settings: Double

Group: General Control

Item: Bit Graphics
Factory Setting: Bidirectional
Other Setting: Unidirectional
Item: Seven or Eight Bit Graphics
Factory Setting: 7 Bit
Other Setting: 8 Bit
Item: Paper Out Override
Factory Setting: No
Other Setting: yes
Item: Print Registration
Factory Setting: 0
Other Settings: -1,-2,-3,-4,-5,+5,4,
+3,+2, or +1
Item: Operator Panel
Factory Setting: Full Operation
Other Setting: Limited
Item: Functions
Factory Setting: --------
Other Setting: Operation
Item: Print Suppress Effective
Factory Setting: Yes
Other Setting: No
Item: Printable DEL Code
Factory Setting: Yes
Other Setting: No

Group Vertical Control

Item: Line Spacing
Factory Setting: 6 LPI (Lines Per Inch)
Other Setting: 8 LPI
Item: Form Tear Off
Factory Setting: Off
Other Setting: On
Item: Skip Over Perforation
Factory Setting: No
Other Setting: Yes
Item: Auto LF (Line Feed)
Factory Setting: No
Other Setting: Yes
Item: Page Length
Factory Setting: 11 (Inches)
Other Settings: 11 2/3,12,14,3,3 1/2,4,
5 1/2,6,7,8, or 8 1/2 (Inches)

Group: Symbol Sets

Item: Character Set
Factory Setting: Standard
Other Setting: DLL, Line Graphics (IBM), or
Block Graphics
Item: Language Set
Factory Setting: American Slashed Zero
Other Settings: American Unslashed Zero,
British, Danish, French,
French Canadian, German,
Italian, Norwegion, Spanish,
or Swedish

Group: Serial Interface

Item: Parity
Factory Setting: None
Other Settings: Odd, or Even
Item: Serial Data
Factory Setting: 8 Bits
Other Setting: 7 Bits
Item: Protocol
Factory Setting: Ready/Busy
Other Setting: X-ON/X-Off
Item: Diagnostic Test
Factory Setting: No

CP60
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MODEL MICROLINE 320(GE5253A)

MISCELLANEOUS ADJUSTMENTS

HEAD GAP ADJUSTMENT

Set Adjustment Lever to Range 1, see Figure 1. Set Paper Lock/Release Lever to lock position. Use a feeler gauge and measure for 0.018 inches ±.002 between Print Head and Platen. If measurement is not correct, depress gear On Adjustment Screw and adjust Screw until gap between Platen and Print Head is correct. Check the gap for .028 ± .002 inch with the adjusting lever at range 3.

CARRIAGE RACK/ROLLER ADJUSTMENT

Use a feeler gauge and measure for 0.004 inches ±0.002 between Roller and Carriage Rack, see Figure 2. If measurement is not correct, loosen Carriage Motor mounting screw, see Figure 3, and reposition Carriage Motor Assembly until measurement is correct. After the adjustment, attach a tension gauge to right side of Ribbon Feed Gear Assembly and ensure Carriage travel load (without Ribbon Cartride) is less than 0.33 lbs, see Figure 3 and Figure 4.

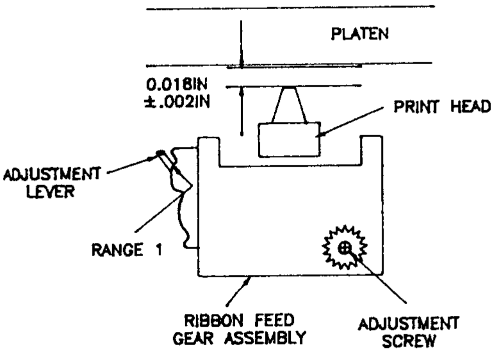

PLATEN
0.018IN
±.002IN
PRINT HEAD
ADJUSTMENT LEVER
RANGE 1
RIBBON FEED GEAR ASSEMBLY
ADJUSTMENT SCREW

FIGURE 1

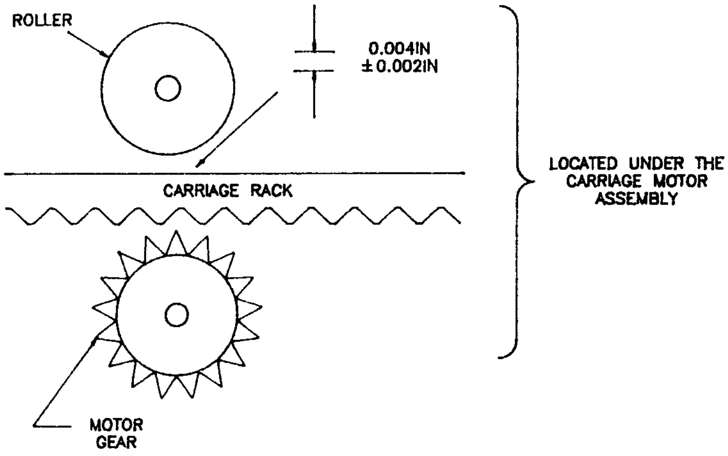

ROLLER
0.004IN
±0.002IN
CARRIAGE RACK
LOCATED UNDER THE CARRIAGE MOTOR ASSEMBLY
MOTOR GEAR

FIGURE 2

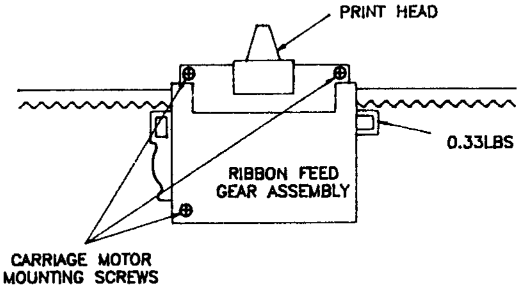

PRINT HEAD
0.33LBS
RIBBON FEED GEAR ASSEMBLY
CARRIAGE MOTOR MOUNTING SCREWS

FIGURE 3

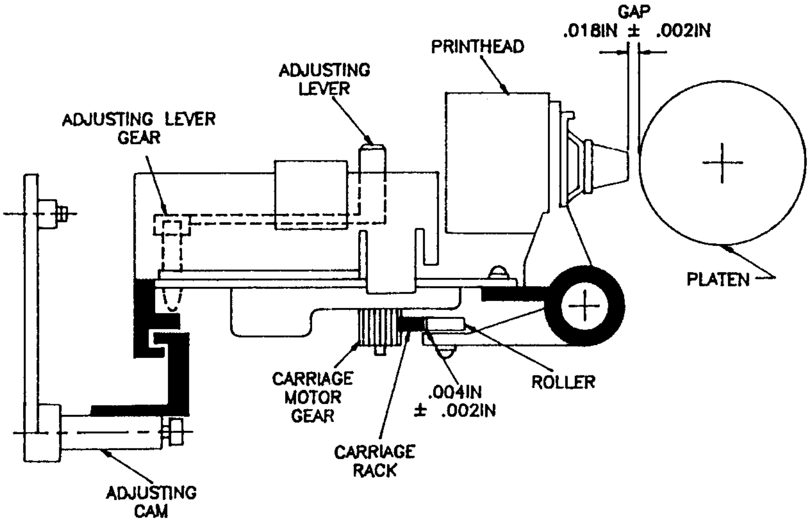

GAP
.018IN ± .002IN
PRINTHEAD
ADJUSTING LEVER
ADJUSTING LEVER GEAR
PLATEN
CARRIAGE MOTOR GEAR
.004IN
± .002IN
ROLLER
CARRIAGE RACK
ADJUSTING CAM

FIGURE 4

DISASSEMBLY INSTRUCTIONS

UPPER COVER ASSEMBLY

Remove Access Cover and Platen Knob. Insert the blade of a flat screwdriver through the three slots in the main frame at the bottom of the front end and disengage the tabs of the upper cover. Lift the front of the upper cover, detach the cover by pushing backward, then lift the cover out of the printer.

CONTROL BOARD

Remove the upper cover assembly, push the tabs holding the Control Board. Remove the Control Board from the main frame and detach the board from the connector on the main board.

MAIN BOARD

Remove the Control Board, turn the locking post 90° clockwise to unlock it. Push the clamp holding the top of the Main Board upward and pull the Main Board to the left. Tilt the Main Board 45° outward, then lift upward. Disconnect the print head cable from the Main Board at connector CN2.

POWER SUPPLY BOARD

Remove the Upper Cover Assembly. Disconnect the transformer cable from connector CN1 on the Power Supply Board. Release the power Supply Board from the tab on the right side. Lift the board from the right side and pull it out of the Power Interconnect Module.

POWER TRANSFORMER

Remove the Upper Cover Assembly. Disconnect the cable from the power Supply Board and the cable from the AC Input Board. Remove one screw and ground wire. Insert the blade of a flat screwdriver into a slot on the bottom of the Lower Cover Assembly to push the lock spring of the Power Transformer. Lift the Power Transformer out of the Lower Cover Assembly.

AC INPUT BOARD

Remove the Upper Cover Assembly, disconnect the Power Transformer cable from the AC Input Board. Remove one screw and ground wire from the power Transformer base. Detach a locking tab on the bottom of the main frame. Lift the AC Input Board out, notice that the AC Line Inlet and the Power Switch are attached to the AC Input Board.

RIBBON DRIVE GEAR ASSEMBLY

Remove the Upper Cover Assembly, remove the Ribbon Cassette. Using a flat blade screwdriver push the two front tabs and then the two rear tabs, then pull upwards and remove the Ribbon Feed Gear Assembly.

CARRIAGE MOTOR ASSEMBLY

Remove the Upper Cover Assembly, remove the Ribbon Cassette. Remove the Print Head. Unlock four tabs to detach the Ribbon Feed Gear Assembly. Remove the Head Cable, Cable Clamp and the Contact Pressure Rubber from the Carriage Motor Assembly. Remove three screws and lift the Carriage Motor Assembly from the cabinet.

CARRIAGE RACK

Remove Carriage Motor Assembly, remove spring from right end of Carriage Rack. Carefully pry left end of Carriage Rack off the printer cabinet. Remove the Carriage Rack.

PLATEN ASSEMBLY

Remove the Upper Cover Assembly. Remove the Ruler Guide by tilting it backward. Move the Ball Arm toward the front of the printer. Push the Release lever to its rear position. Pull the Lock-levers upwards. Remove the Platen Assembly from the main frame.

RIBBON PROTECTOR

Remove the Print Head, remove the Platen Assembly and remove the Head Clamp. Move the Ball Arm toward the front of the printer. Pull the Ribbon Protector upward from the carriage frame.

LINE FEED MOTOR

Remove the Main Board. Remove the Platen Assembly. Remove the board lock which is positioned above the line Feed Motor. Using a flat blade screw driver open the lock lever and push the bracket of the Line Feed Motor outward to the left. Remove the Line Feed Motor from the guide holes in the frame.

PRESSURE ROLLER ASSEMBLY

Remove the Platen Assembly. Take out the Paper Chute. Detach the Reset Spring by pushing the horizontal part down at the center of the spring while pulling the spring out to the right of the printer to remove it. Remove the Change Gear and the Idler Gear. Remove the Pressure Roller Assembly from the main frame.

TRACTOR ASSEMBLY

Remove the Pressure Roller Assembly, then remove the Tractor Gear from the drive shaft of the Tractor Assembly. Lift the Drive Shaft and slide it to the right until its left end is exposed from the guide hole. Remove the lock shaft from the right guide. Slide the Tractor Frames ot of the two shafts. When reinstalling align the Pin Tractor Wheels on both tractor frames left and right.

LOGIC CHARTS (Continued)
MAIN BOARD

PIN NO.	IC Q11	PIN NO.	IC Q11	PIN NO.	IC Q11	PIN NO.	IC Q11	PIN NO.	IC Q11	PIN NO.	IC Q12	PIN NO.	IC Q12
1	H	21	P	41	P	61	P	81	H	1	P	13	P
2	H	22	P	42	P	62	P	82	P	2	P	14	P
3	P	23	P	43	P	63	P	83	L	3	P	15	P
4	P	24	P	44	P	64	P	84	P	4	P	16	P
5	P	25	P	45	P	65	P	85	H	5	P	17	P
6	P	26	P	46	P	66	L	86	L	6	P	18	P
7	P	27	P	47	P	67	L	87	L	7	P	19	P
8	P	28	P	48	P	68	L	88	L	8	P	20	P
9	P	29	P	49	L	69	L	89	H	9	P	21	P
10	P	30	H	50	H	70	L	90	H	10	P	22	P
11	P	31	H	51	H	71	L	91	H	11	P	23	P
12	H	32	P	52	H	72	H	92	H	12	L	24	H
13	P	33	P	53	H	73	L(20)	93	H				
14	P	34	P	54	L	74	H(16)	94	H				
15	P	35	P	55	H	75	H(16)	95	H				
16	L	36	P	56	H	76	L(16)	96	H				
17	P	37	P	57	H	77	L(16)	97	H				
18	H	38	P	58	L	78	L	98	H				
19	H	39	P	59	H	79	H	99	H				
20	P	40	H	60	L	80	L	100	H				

PIN NO.	IC Q13	IC NO.	PIN Q13	IC NO.	PIN Q14	IC Q15
1	P	15	P	1	L	L
2	P	16	P	2	H	H
3	P	17	P	3	H	H
4	P	18	P	4	L	H
5	P	19	P	5	L	H
6	P	20	L	6	H	*
7	P	21	P	7	L	*
8	P	22	P	8	H	*
9	P	23	P	9	L	*
10	P	24	P	10	L	*
11	P	25	P	11	H	*
12	P	26	P	12	L	L
13	P	27	P	13	H	L
14	L	28	H	14	H	L

CONTROL BOARD

PIN NO.	IC Q1	IC Q2	IC Q3	IC Q4
1	P	L(23)	P	H
2	L	*(24)	L	*
3	L	L(21)	L	L(21)
4	H	*(22)	H	*
5	L(21)	H	L(21)	L(23)
6	L(23)	*	L(23)	*
7	L	L	L	L
8	P	*	P	*
9	H	*	H	H
10	H	*(26)	H	*
11	L(27)	L(25)	L(27)	L(27)
12	L(25)	*(28)	L(25)	*
13	P	L(27)	P	L(25)
14	H	H	H	H

LOGIC CHARTS

MAIN BOARD

PIN NO.	IC Q1	PIN NO.	IC Q4	IC Q5	IC Q6	PIN NO.	IC Q7	PIN NO.	IC Q7	PIN NO.	IC Q7
1	P	1	P	P	L	1	P	21	P	41	H
2	H	2	P	P	L	2	P	22	P	42	H
3	P	3	P	P	H	3	P	23	P	43	H
4	H	4	P	P	H	4	L	24	P	44	H
5	P	5	P	P	*	5	P	25	P		
6	H	6	P	P	H	6	*	26	P		
7	P	7	L	L	*	7	H	27	P		
8	H	8	P	P	H	8	P	28	L		
9	P	9	P	H	*	9	H	29	L		
10	L	10	P	H	*	10	P	30	P		
11	H	11	H	P	H	11	P	31	P		
12	P	12	H	P	L	12	P	32	P		
13	H	13	L	P	H	13	P	33	P		
14	P	14	H	H	L	14	P	34	P		
15	H					15	P	35	P		
16	P					16	L	36	P		
17	H					17	L	37	P		
18	P					18	P	38	H		
19	P					19	P	39	*		
20	H					20	P	40	H		

PIN NO.	IC Q8	IC Q9	PIN NO.	IC Q10	PIN NO.	IC Q10
1	P	P	1	L	15	P
2	P	P	2	P	16	P
3	P	P	3	H	17	H
4	P	P	4	P	18	H
5	P	P	5	L	19	P
6	P	P	6	L	20	L
7	P	P	7	L	21	L
8	P	P	8	L	22	L
9	H	H	9	L	23	L
10	P	P	10	P	24	L
11	P	P	11	H	25	P
12	P	P	12	H	26	H
13	P	P	13	P	27	P
14	P	P	14	P	28	L
15	P	P				
16	P	P				
17	P	P				
18	L	L				

TROUBLESHOOTING

POWER SUPPLY

If Printer is dead, check AC Fuse (F1) on AC Input Board. If open replace Fuse and reapply power. If Fuse F1 opens again remove alarm SCR (SCR) and replace Fuse F1. Momentarily turn on the power, if Fuse F1 opens check for shorts in AC Input Board, Capacitors C1 thru C3, Power Transformer T1 and Bridge Rectifiers (D1 and D12). If Fuse F1 is not open check for about 5.0V on the SCR gate. If the 5V is present that indicates that the alarm circuit has activated because of a drive circuit problem. Check Alarm Circuit Transistors (TR109 and TR11), zener diode D102 and diodes D10 and D12 and associated components for possible shorts. If alarm circuit components are good, check voltages and components associated with Transistor TR106, Diode D105 and Driver ICs (Q2 and Q3) in the Print Head driver circuit. Check voltages and components associated with transistor TR1 and Y Driver IC (IC1) for the spacing motor and associated components.

If AC Input Board Fuse, F1, is good, check Power Supply board Fuse (F1). If open, check Bridge Rectifier D12, 5V Regulator IC (IC1). If Fuse F1 on the power supply board is good, check for 5V at the output of the regulator IC (IC1). Check for 49.2V at the emitter of the 40V regulator transistor (Q1). Check for 40.1V at the collector of transistor Q1. If the 40.1V and the 5V are both missing check the Power Transformer T1. Check for 120VAC across the primary winding. If missing check coil L1 for possible open and check Power Switch (SW9).

CPU OPERATION

Check voltages, logic and waveforms associated with CPU IC (Q7). If waveforms on pins 14 and 15 of Q7 are not correct, check Oscillator (OSC) by substitution. If logic is not correct at pin 4 of ICQ7, check for 4.2V at pin 7 of ICQ6, 1.7V at pin 9 and .3V at pin 14 of ICQ6. If voltages are correct, check ICQ6 and components associated with pin 14 of ICQ6. If voltage is not correct, check zener diode D110, resistor R49 and check transistor TR104 for shorts.

PRINT HEAD

If characters are printed, but are too light or uneven, check the Print Head gap adjustment. Remove the Print Head and check for 20 ohms between pin 5 and each of pins 1 thru 4 and pins 9 thru 13 of the Print Head Edge Connector. If any resistance is not correct, check Print Head by substitution. If the Print Head checks good, initiate printer self--test and check for pulses at pin 12 of Controller IC (Q11). If pulses are missing check IC Q11 by substitution.

LINE FEED MOTOR

Check for 7.0 ohms between pins 1 and 2 and between pins 3 and 4 of Connector CN7. If resistance is not correct check Line Feed Motor by substitution. If Line Feed Motor is good check contacts at CN7 for good connection. With printer OFF line, press Form Feed and check waveforms on pins 4, 10, 19 and 25 of Driver IC (Q10). If waveforms are not correct, check waveforms on pins 14 and 15 of Q10. If waveforms are not correct, check controller IC (Q11) and associated components. If the waveforms on pins 14 and 15 of IC (Q10) are correct, check waveform on pin2 of IC Q10. If waveform is not correct check voltages and components associated with transistors TR20 and TR120.

CARRIAGE MOTOR

Check for 20 ohms between pins 16 and 17 and pins 17 and 18 of carriage cable. If resistance is not correct, check Carriage Motor Assembly by substitution. If Carriage Motor Assembly is good, check the carriage cable and check for good connection at connector CN2. If resistance is good check for a logic low on pin 73 of Controller IC (Q11). If logic is high, it indicates the Head Temperature circuit has been activated. Check if print Head is cool, check Print Head by substitution. Check logic readings at ICs Q6 and Q15. Move the carriage manually and check for pulses at pin 79 and 80 of IC Q11. If pulses are missing check the Carriage Motor Assembly by substitution. Check waveforms, voltages and components associated with IC1, check IC1 by substitution.

PRINTER DOES NOT RECEIVE DATA

Printer successfully performs Printer Self-test, but does not receive data from host computer. Porgram host computer to send data to printer. Check logic readings, voltages and components associated with Buffer IC (Q14), Controller IC (Q11), and CPU IC (Q7).

SENSOR OPERATION

Turn on Printer without paper installed and check for a logic low at pin 57 of Controller IC (Q11). Install paper in printer and check for a logic high at pin 57 of ICQ11. If logic is not correct on pin 57 of IC Q5, check the Paper Empty Sensor and associated components.

SELF-TEST

The Printer Self-Test is initiated by turning On printer power while pressing Line Feed switch. Printer will produce one page of a limited sample of all available print styles. When the test is complete, the printer stops and the SEL light will turn On.

By turning On print power while holding down TOF/QUIET switch printer will produce a continuous sample of the default print style. To stop either test, press the MODE switch.

The Printer Self-Test starts the first line with information about the Printer, such as the model of the Printer, the Emulation EI=Epson/IBM, or ML=Microline Standard the national version A=U.S. version and the firmware revision number as F/W 01.05.

TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

Equipment	B&K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1541A, 2120, 2125, 2160	SC61	
LOGIC PROBE	DP51, DP21		
LOGIC PULSER	DP101, DP31		
DIGITAL VOM	388HD, 2800 SERIES, 2900 SERIES	DVM37, DVM56A, SC61	
ANALOG VOM	114, 117, 177, 214		
ISOLATION TRANSFORMER	TR110, 1604, 1653, 1655	PR57	
FREQUENCY COUNTER	1803, 1804, 1805	FC71, SC61	
COLOR BAR GENERATOR	1211B, 1251, 1260, 1249	CG25, VA62A, NT64	
RGB GENERATOR	1260, 1249	RG67	
FUNCTION GENERATOR	3020, 3011A, 3026, 3030		
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200 TP212	
TEMPERATURE PROBE	TP-28, TP-30		
CRT ANALYZER	467, 470, 480, 490	CR70	
DIGITAL IC TESTER	560, 550, 552		
CAPACITANCE ANALYZER	810, 820, 830	LC76, LC101, LC102	
INDUCTANCE ANALYZER		LC76, LC101, LC102	
TRANSISTOR TESTER		TF46	
FLYBACK-YOKE TESTER		LC76, LC101, LC102	

DIAGNOSTIC TEST USING

Fault Alarm Display

When printer detects a fault, an alarm state will be displayed on the leds as follows:

Alarm	Severity of Fault	LED MESSAGE								ERROR
		PRIMARY MESSAGE			DETAIL MESSAGE					
		Menu	ALARM	SEL	10 CPI	12 CPI	17 CPI	20 CPI	PROP	
Paper Out	Alarm	Current mode	on	off	current CPI					Paper
Printhead	Alarm	blink	off	on	current CPI					Hot Head
MPU	Fatal	off	blink	off	on	-	-	-	-	MPU error
ROM	Fatal	off	blink	off	-	on	-	-	-	ROM error
RAM	Fatal	off	blink	off	-	-	on	-	-	RAM error
Carriage Motor	Fatal	off	blink	off	-	-	-	on	-	Spacing error
Serial Interface	Fatal	off	blink	off	-	-	-	-	on	Serial/IF board error

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	ZENITH PART No.	NOTES
Q8,9	M41464-12					
Q10	M54646P					
Q11	M6990					
Q12	M5128-20					
Q13	D27512J-1					
Q14	74LS06(SM)					
Q15	2901	NTE834SM	ECG834SM			
TR1	BFTD (10)					
TR3	8CT (10)					
TR5	B882	NTE264	ECG264	SK3181A/264		
	2SB882	NTE264	ECG264	SK3181A/264		
TR11,13	BR (10)					
TR14,15	6A (10)					
TR17	DG (10)					
TR19	S-6 (10)					
TR20	6A (10)					
TR104	BR (10)					
TR106	0.4 (10)					
TR107	FR (10)					
TR109	6A (10)					
TR111	BR (10)					
TR118,120	6A (10)					
POWER SUPPLY						
D1	RB60					
D2	CR8AM8					
D3	ERC35-02	NTE580	ECG580	SK5036/580		
D8	1SS229	NTE519 N2	ECG519 N2	SK3100/519 N2		
D9	5.6B2	NTE5011A	ECG5011A	SK5A6/5011A		
D10	39B6					
D11						
D12	RB40	NTE5314	ECG5314	SK3987/5314		
D14	20B1					

PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	ZENITH PART No.	NOTES
CONTROL BOARD						
Q1	HD74LS164P	NTE74LS164	ECG74LS164	SK74LS164		
Q2	SN74LS06N					
Q3	HD74LS164P	NTE74LS164	ECG74LS164	SK74LS164		
Q4	SN74LS06N					
TR1	C114ESC					
	DTC114ESC					
MAIN BOARD						
D2						
D4						
D10,12	MT (10)					
D16	30T (10)					
D18,21	MT (10)					
D101	30M (10)					
D102	102 (10)					
D103	4.7H (10)					
D105	N (10)					
D110	4.7H (10)					
D112	N (10)					
D113	7.5M (10)					
D114	30L (10)					
D119	27T (10)					
D121	N (10)					
IC1	HA13412					
Q1	74LS244(SM)					
Q2,3	LB1731					
Q4	LS02(SM)					
Q5	74LS10(SM)					
Q6	2901	NTE834SM	ECG834SM			
Q7	M80C154V-1					

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
	POWER SUPPLY BOARD			
RV1	V Adjust	200		

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	
	CHASSIS			
TH1	4000 Cold NTC			
	POWER SUPPLY BOARD			
R10	27K 1% 1/4W Carbon Film			
R11	820 1% 1/4W Carbon Film			
R17	10 5% 5W WW		5W010	
R21	.2 10% 5W WW		5WD20	
TH1	3.7 Cold PTC			

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.
	MAIN BOARD	
L1	RF Choke	
L2	RF Choke	
L3	RF Choke	
L4	RF Choke	
L5	RF Choke	
L7	RF Choke	
	POWER SUPPLY BOARD	
L1	RF Choke	

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	ZENITH PART No.	NOTES
IC1	3052V					
IC2	5291					
Q1	B1420 2SB1420					
Q2	C2719K 2SC2719K					
Q3,4,5	C2719L 2SC2719L					

(10) Number on unit.

CAPACITORS

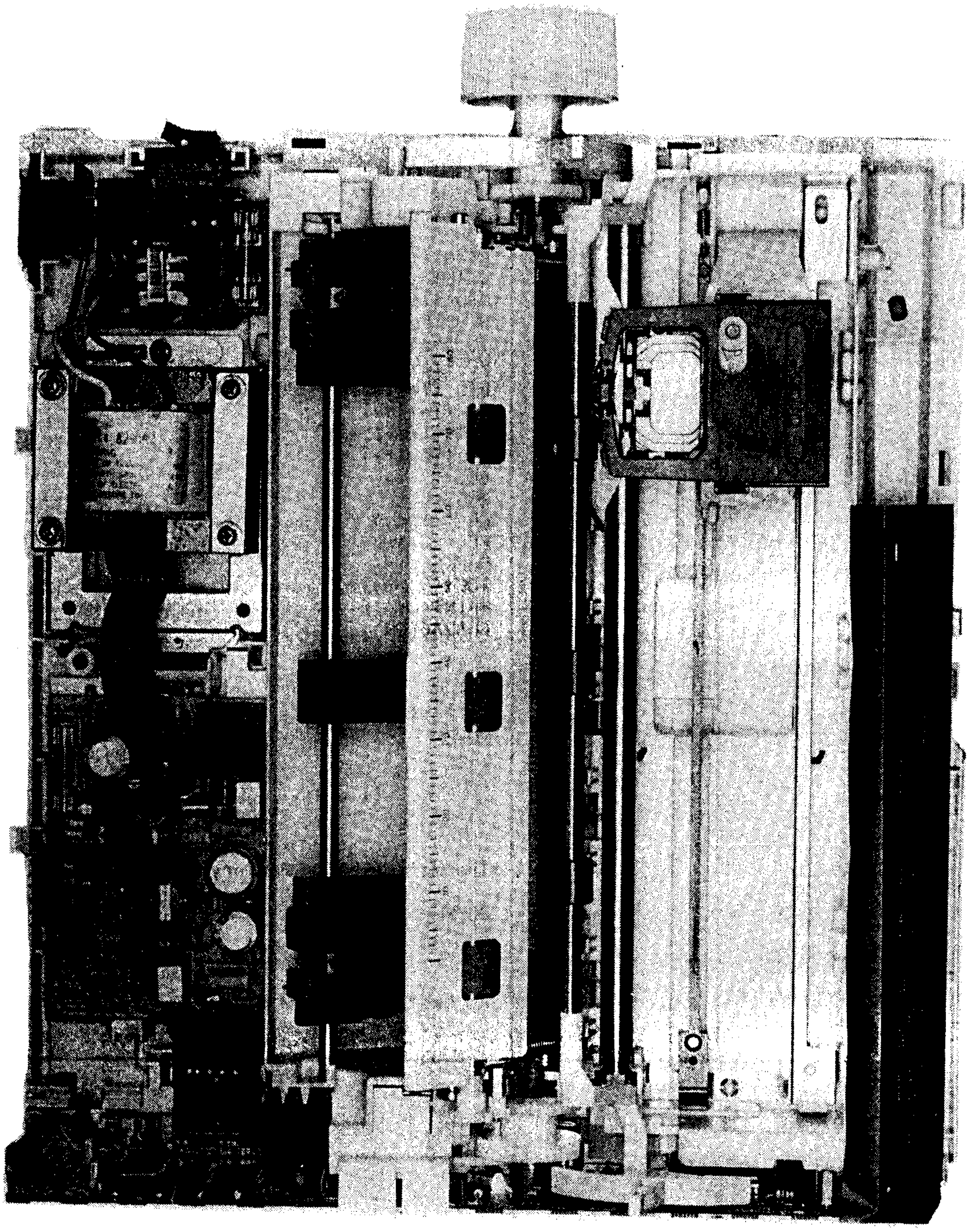
ITEM No.	RATING	MFGR. PART No.
	AC INPUT BOARD	
C1	.1 250VAC	

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

MISCELLANEOUS

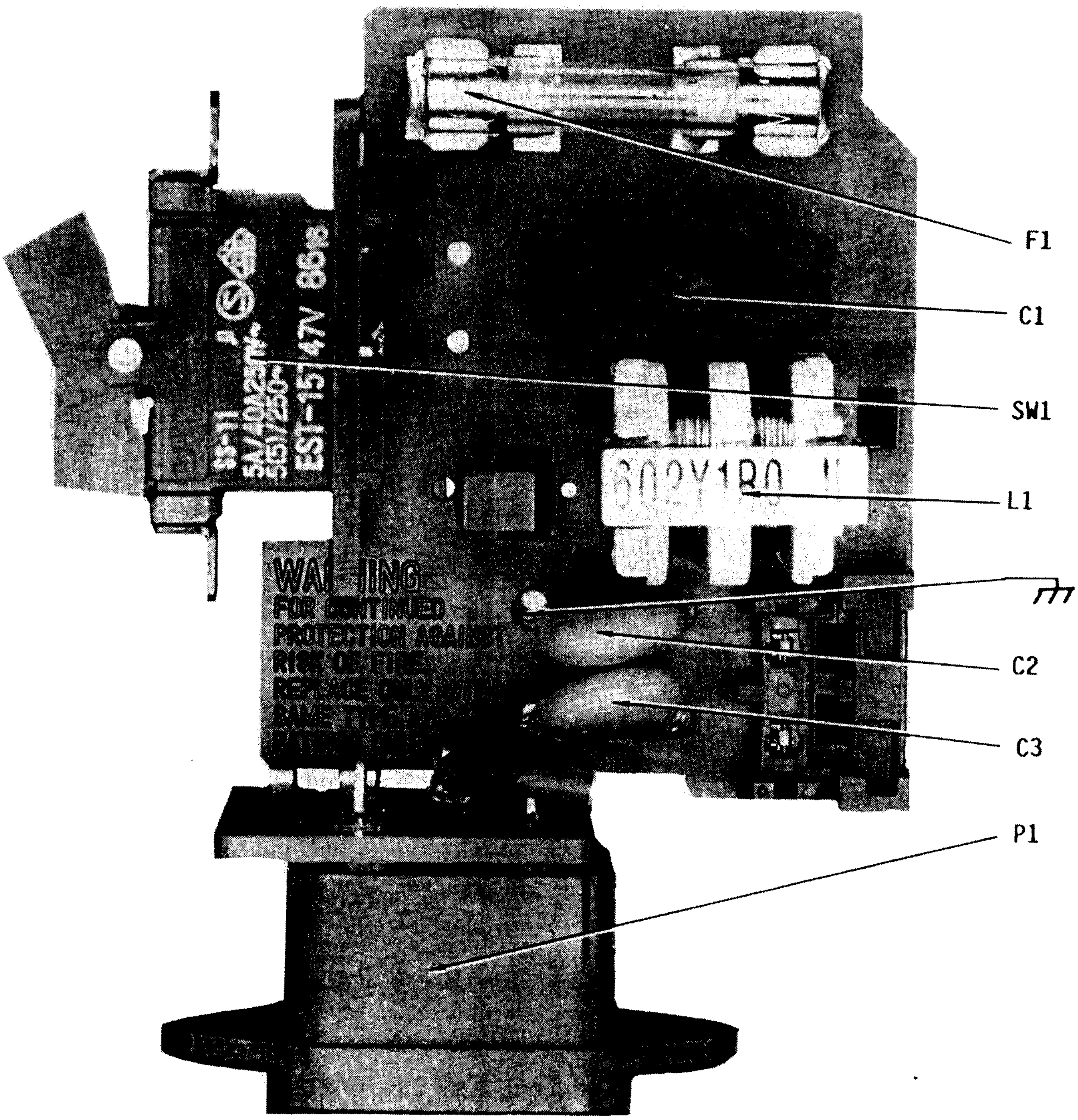
ITEM No.	PART NAME	MFGR. PART No.	NOTES
	CHASSIS		
M2	Line Feed Motor		
M3	Print Head		
P1	Cord		AC Line
	Board		For Space Motor Assembly
	CONTROL BOARD		
D1	LED		LED (Yellow)
D2	LED		ALM (Red)
D3	LED		POWER (Yellow)
D6	LED		MENU (Yellow)
D7	LED		QUIET (Yellow)
D8	LED		HSD (Yellow)
D9	LED		NLQ (Yellow)
D10	LED		10 (Yellow)
D11	LED		20 (Yellow)
D12	LED		UTL (Yellow)
D13	LED		12 (Yellow)
D14	LED		PROP (Yellow)
D15	LED		17 (Yellow)
SW1	Switch		SEL
SW2	Switch		MODE
SW3	Switch		LF
SW4	Switch		FF
SW5	Switch		PARK
SW6	Switch		TOF
SW7	Switch		PRINT
SW8	Switch		CHARACTER
	LINE FILTER BOARD		
F1	Fuse 1.5 Amp 250V		AC Fast Acting
SW9	Switch		POWER
	MAIN BOARD		
S101	Switch		
S102	Switch		
TF1	Fuse 5A 250V		Thermal, 165° C Battery
	Oscillator (16MHz)		
	Relay		BASW
	POWER SUPPLY BOARD		
F1	Fuse 2 Amp 250V		AC Fast Acting
FB1	Ferrite Bead		



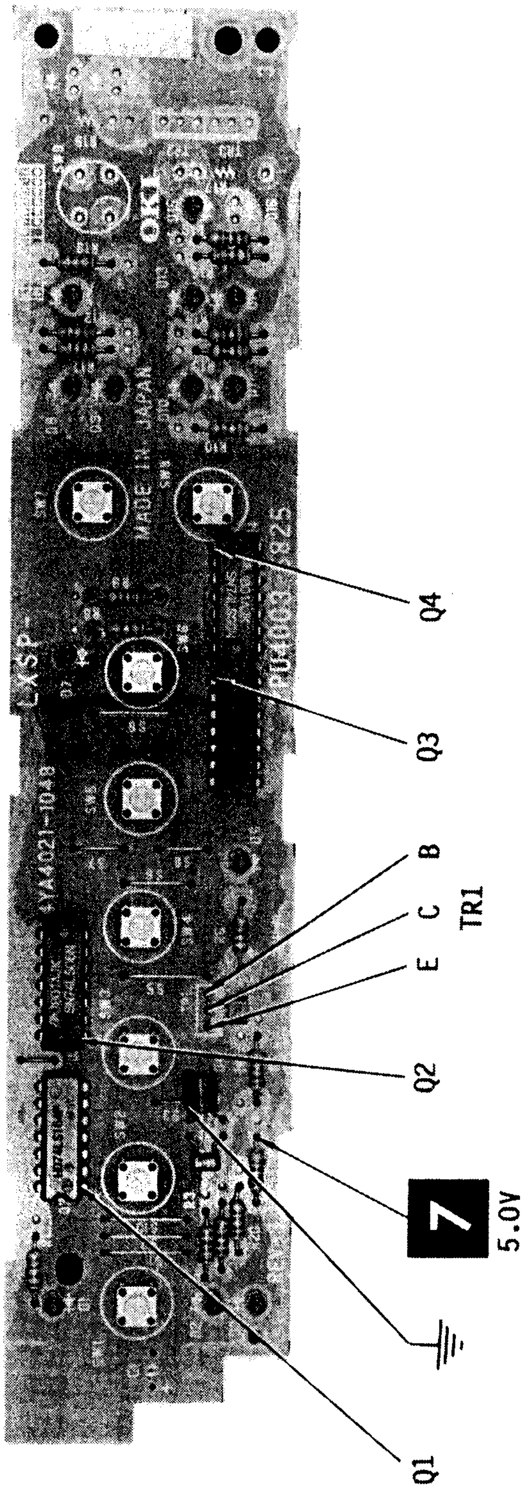
CHASSIS - OVERALL VIEW

CP60

OKIDATA
MODEL MICROLINE 320(GE5253A)


F1
C1
SW1
L1
C2
C3
P1

AC INPUT BOARD

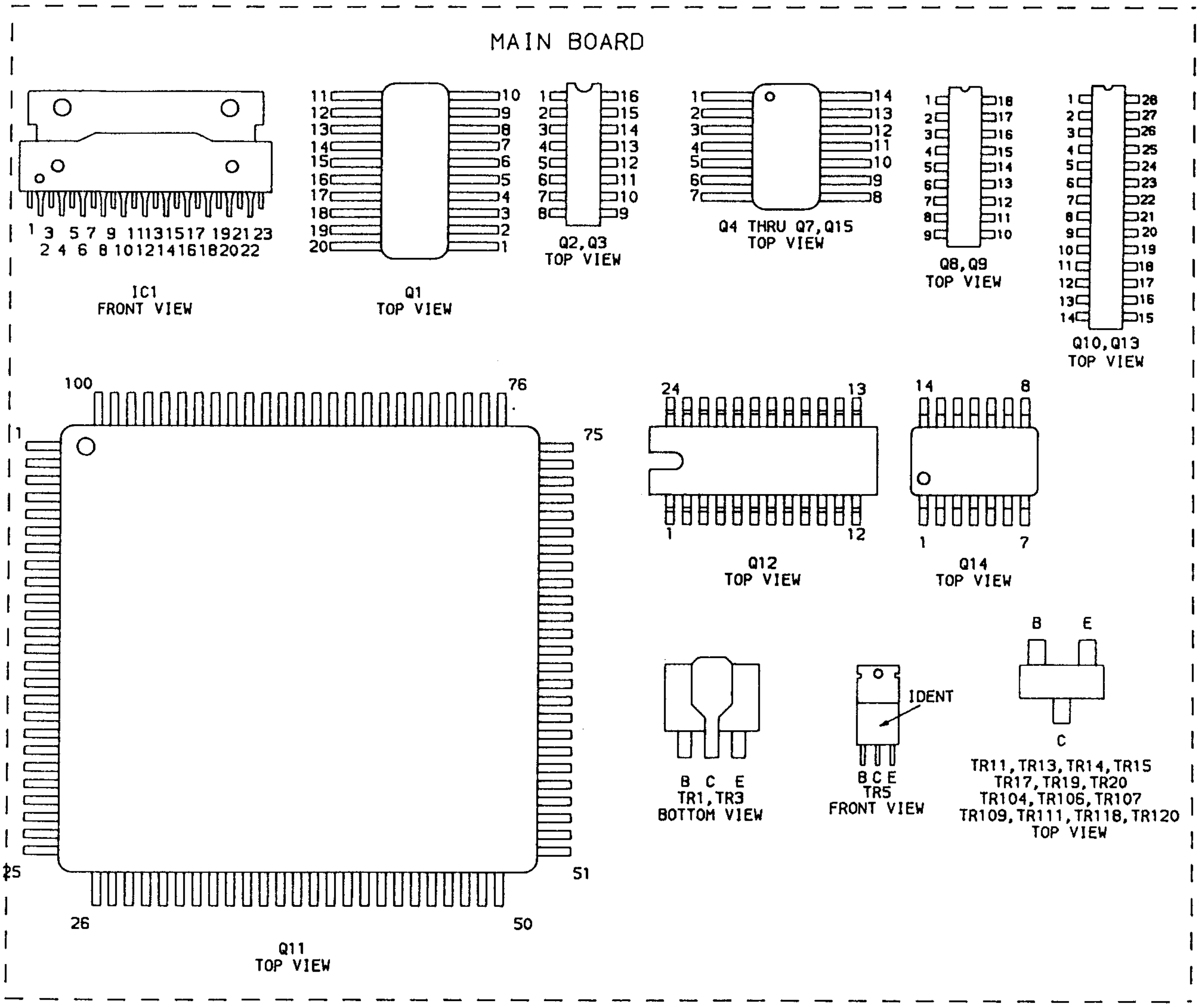

Q4
Q3
B
C
E
TR1
Q2
7
5.0V
Q1
LXSP-
4YA4021-1048
PU4003
MADE IN JAPAN
OKI

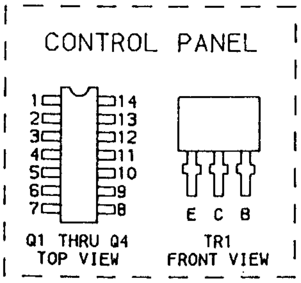
NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED

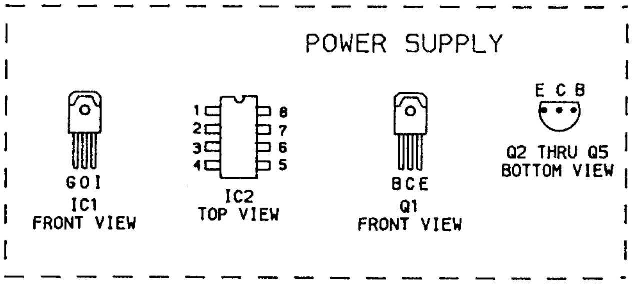
CONTROL BOARD

A Howard W. Sams CIRCUITRACE™ Photo

IC PINOUTS AND TERMINAL GUIDES


MAIN BOARD
1 3 5 7 9 11 13 15 17 19 21 23
2 4 6 8 10 12 14 16 18 20 22
IC1
FRONT VIEW
Q1
TOP VIEW
Q2,Q3
TOP VIEW
Q4 THRU Q7,Q15
TOP VIEW
Q8,Q9
TOP VIEW
Q10,Q13
TOP VIEW
100
76
1
75
25
51
26
50
Q11
TOP VIEW
24
13
1
12
Q12
TOP VIEW
14
8
1
7
Q14
TOP VIEW
B C E
TR1,TR3
BOTTOM VIEW
IDENT
B C E
TR5
FRONT VIEW
B
E
C
TR11,TR13,TR14,TR15
TR17,TR19,TR20
TR104,TR106,TR107
TR109,TR111,TR118,TR120
TOP VIEW


CONTROL PANEL
Q1 THRU Q4
TOP VIEW
E C B
TR1
FRONT VIEW


POWER SUPPLY
G O I
IC1
FRONT VIEW
IC2
TOP VIEW
B C E
Q1
FRONT VIEW
E C B
Q2 THRU Q5
BOTTOM VIEW

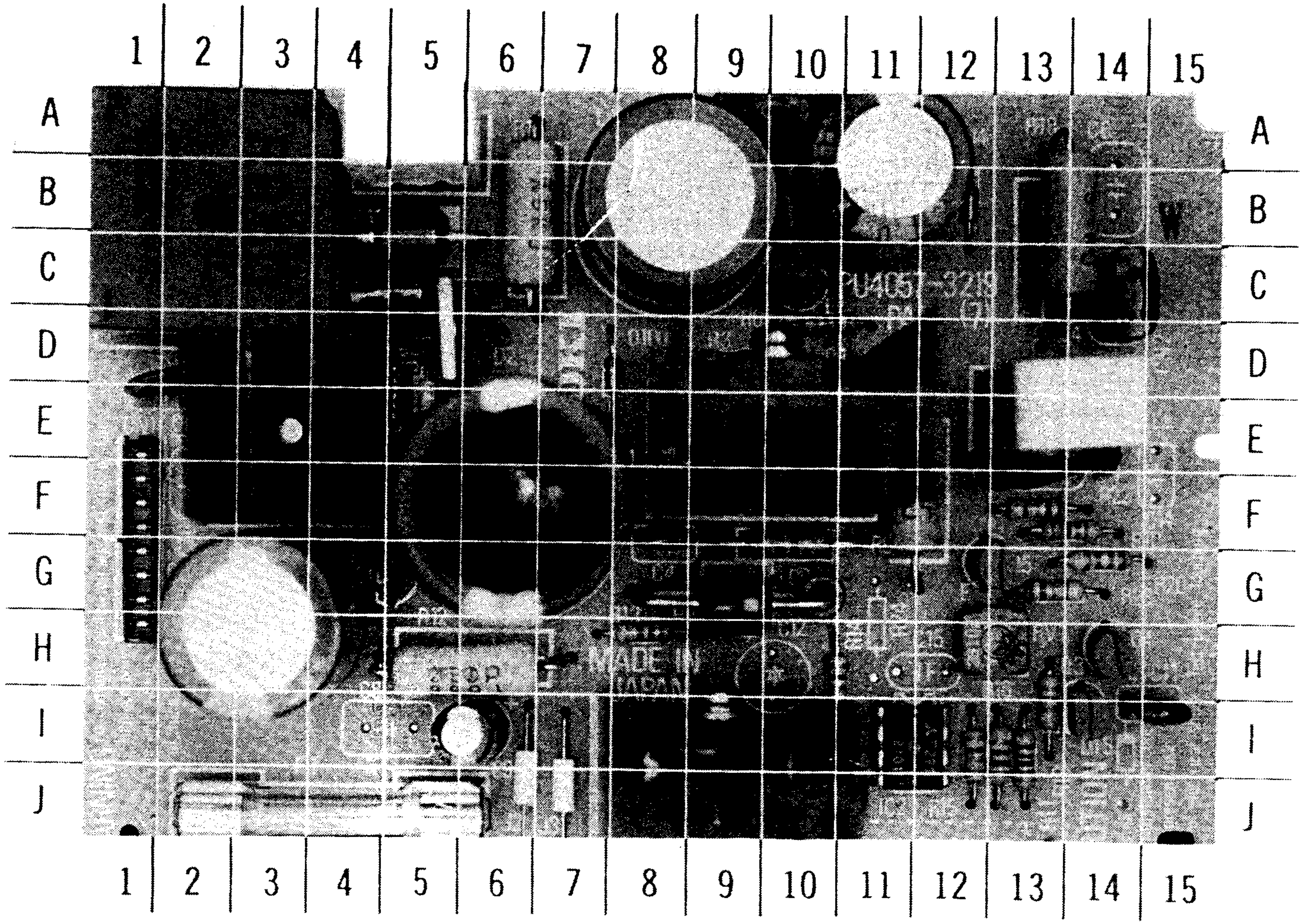
CP60

OKIDATA
MODEL MICROLINE 320(GE5253A)

POWER SUPPLY BOARD
GridTrace LOCATION GUIDE

C1	F-6	Q1	D-10
C2	C-5	Q2	C-10
C3	D-2	Q3	I-14
C4	G-8	Q4	H-14
C5	A-11	Q5	G-13
C7	G-2	R1	B-6
C9	I-6	R2	E-5
C10	C-14	R3	D-9
C11	I-15	R4	F-12
C13	J-11	R6	D-10
CN1	H-1	R9	F-10
CN2*	A-15	R10	F-14
D1	B-2	R11	I-13
D2	D-6	R12	H-5
D3	G-9	R13	H-8
D8	G-4	R14	H-11
D9	G-9	R15	I-12
D10	D-8	R16	I-13
D11	B-5	R17	A-5
D12	D-2	R18	B-3
D14	B-12	R19	I-13
F1	J-2	R20	G-14
FB1	G-10	R21	E-14
IC1	I-8	R22	F-13
IC2	I-11	R23	G-13
J1	E-5	RV1	H-13
J2	J-6	TH1	E-13
J3	J-7		
J4	B-14		
L1	B-8		

*Located on bottom of board.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
I
J
PU4057-3219
MADE IN JAPAN

POWER SUPPLY BOARD

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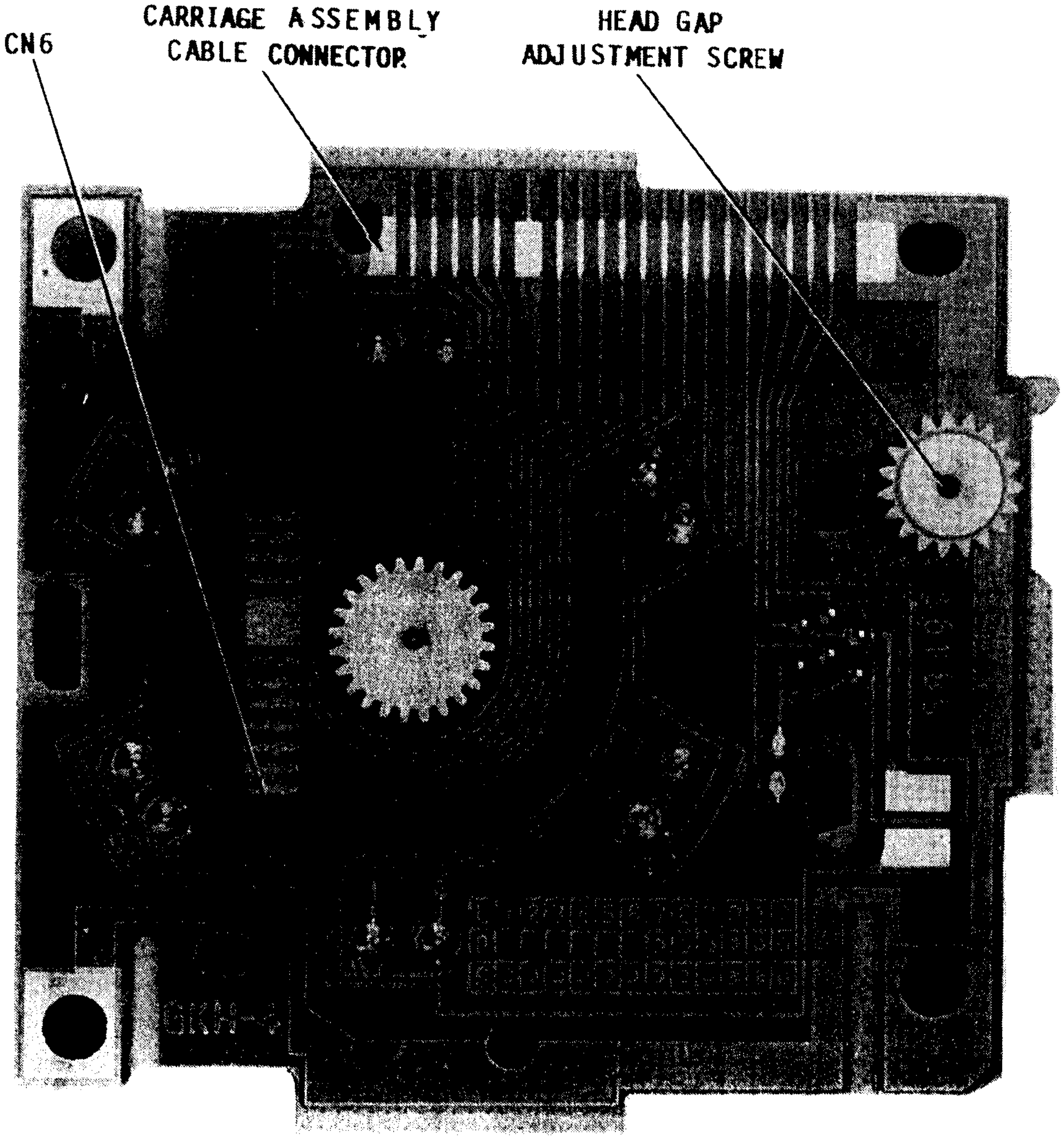
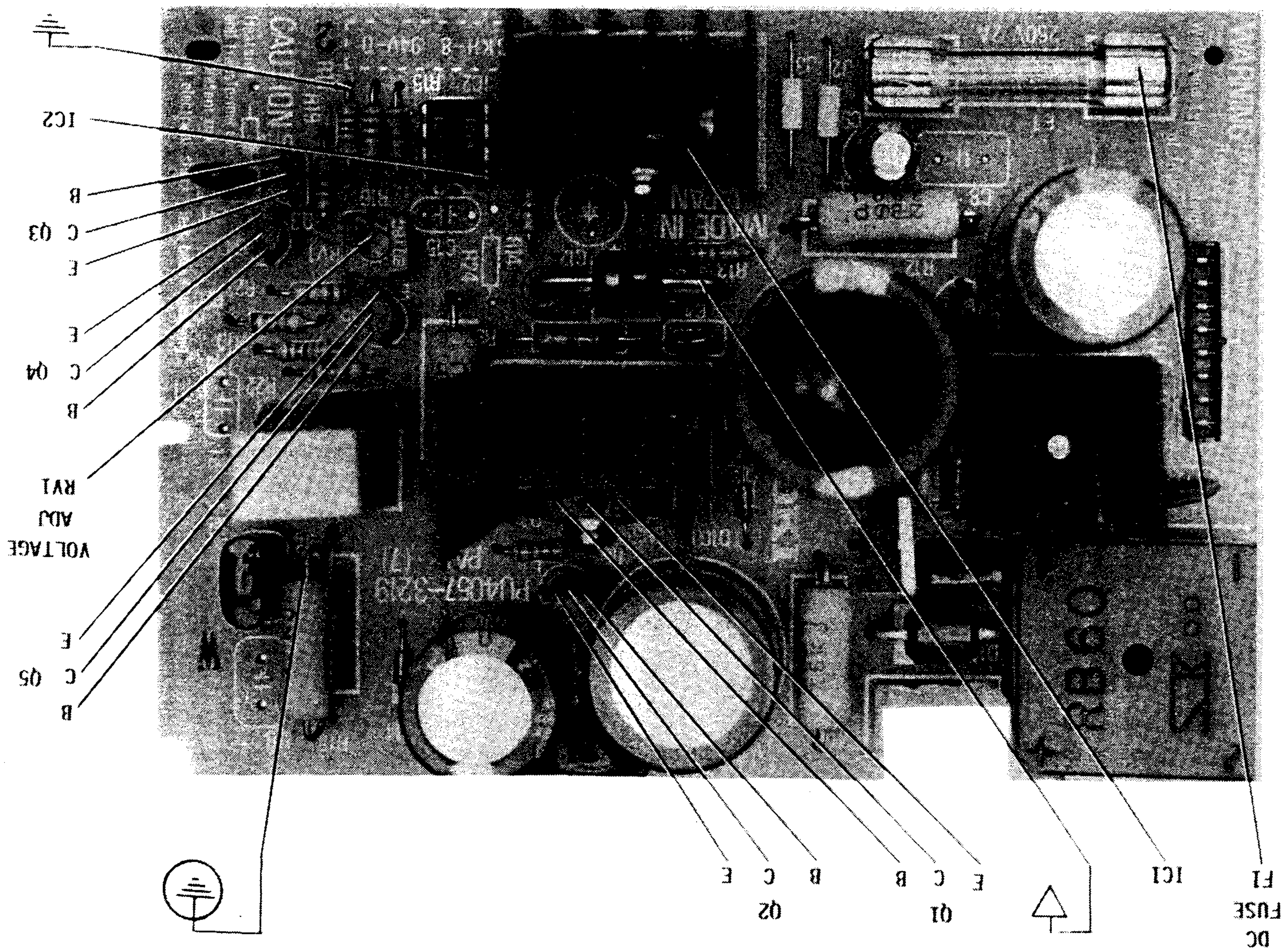

CN6
CARRIAGE ASSEMBLY CABLE CONNECTOR
HEAD GAP ADJUSTMENT SCREW

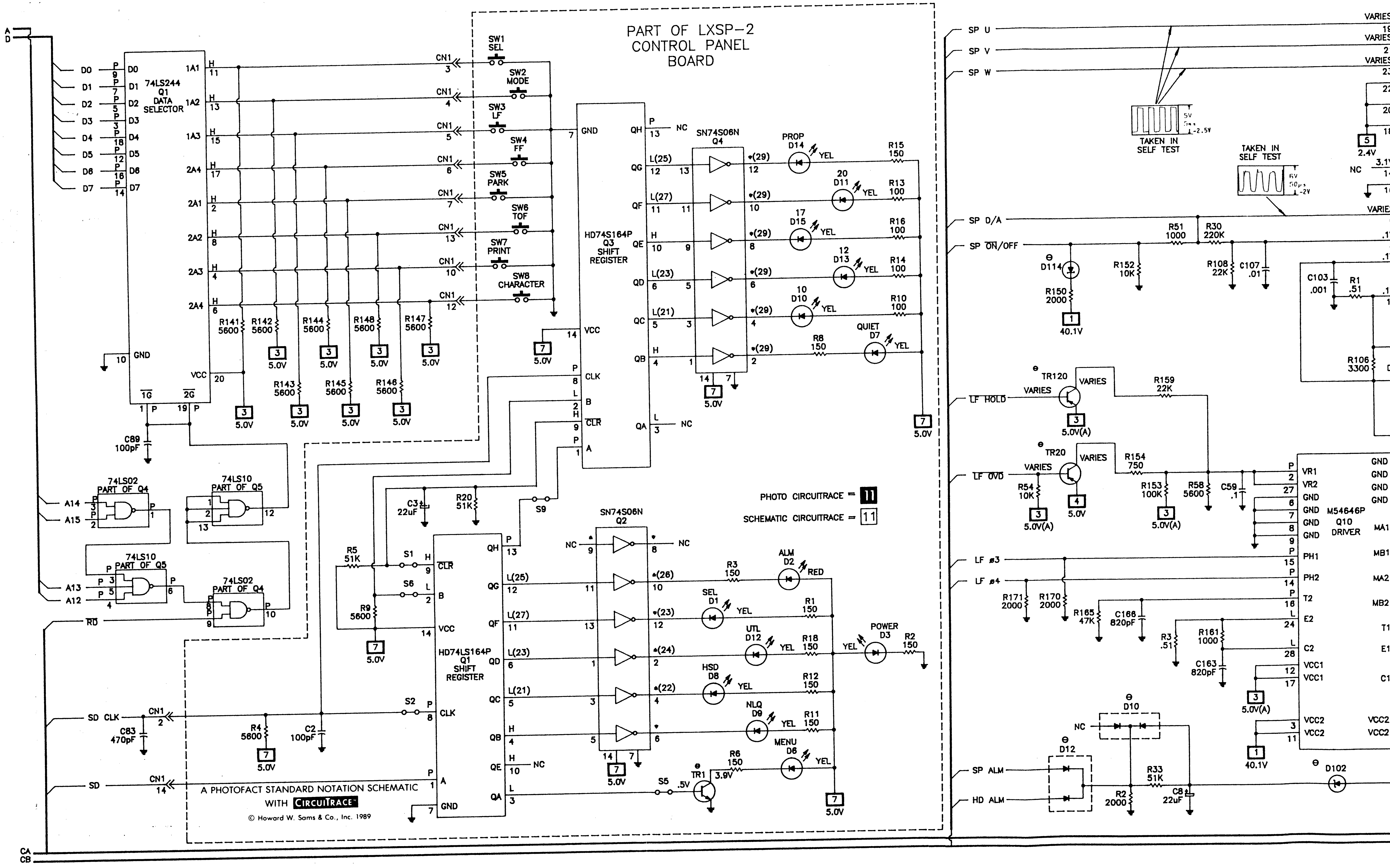
SPACE (CARRIAGE) MOTOR BOARD

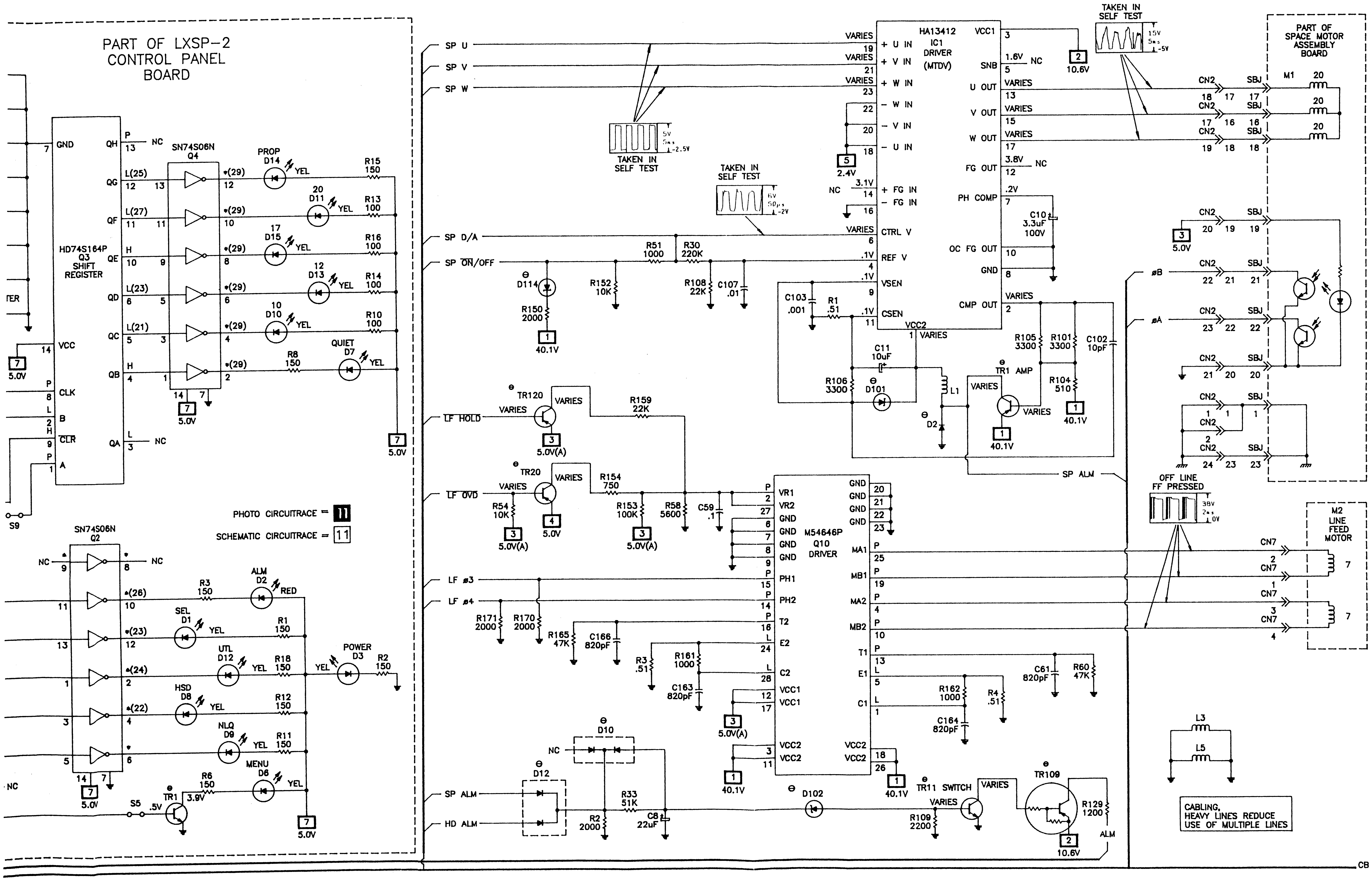
CP60 OKIDATA MODEL MICROLINE 320(GE5253A)

NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED

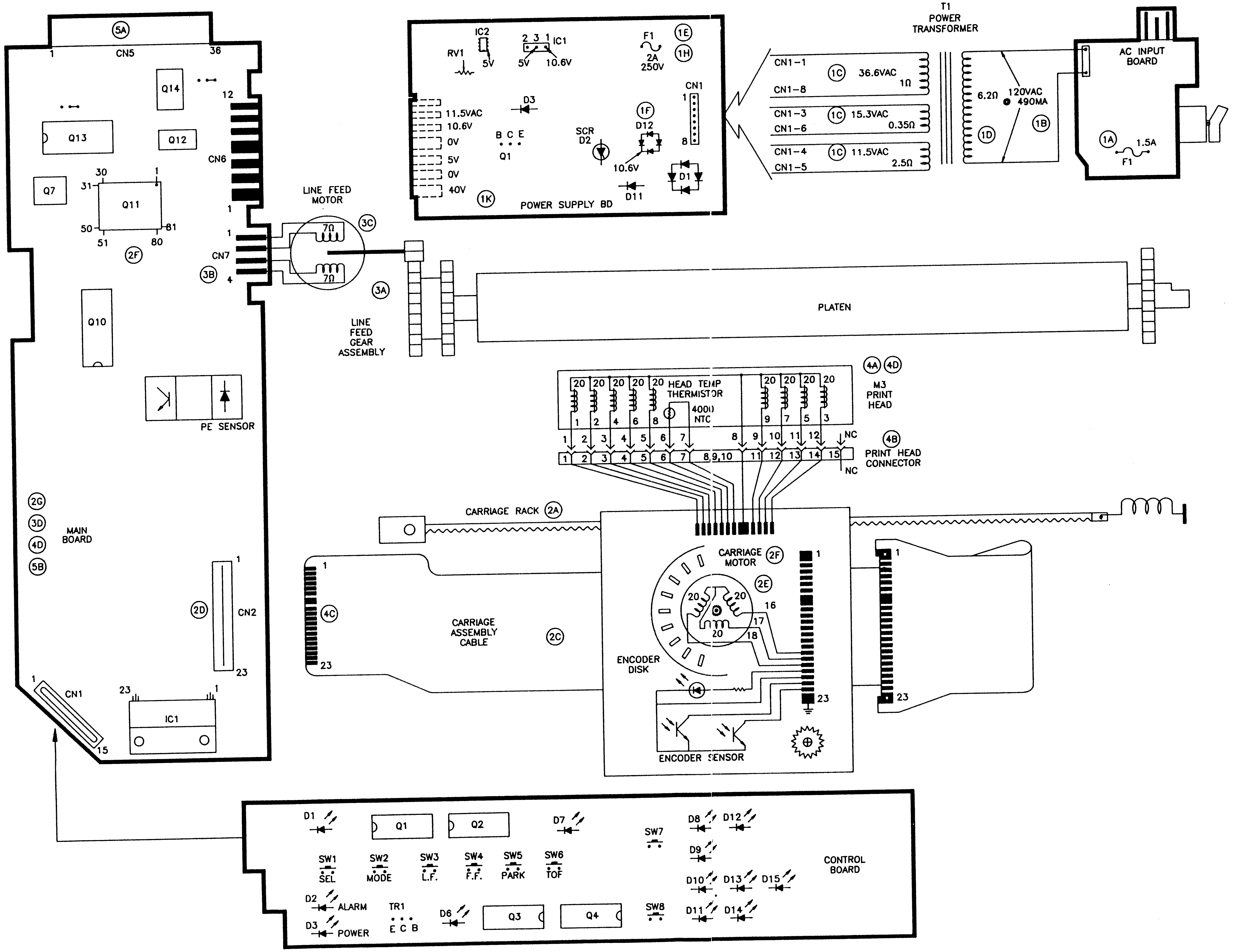
▽ COMMON TIE POINT


IC2
B
C Q3
E
E
C Q4
B
VOLTAGE
ADJ
RV1
E
C Q5
B
Q2
B C E
Q1
B C E
IC1
DC
FUSE
F1


PART OF LXSP-2
CONTROL PANEL
BOARD
74LS244
Q1
DATA
SELECTOR
D0
D1
D2
D3
D4
D5
D6
D7
1A1
1A2
1A3
2A4
2A1
2A2
2A3
2A4
GND
VCC
1G
2G
C89
100pF
74LS02
PART OF Q4
74LS10
PART OF Q5
A14
A15
A13
A12
RD
SD CLK
SD
CN1
C83
470pF
SW1
SEL
SW2
MODE
SW3
LF
SW4
FF
SW5
PARK
SW6
TOF
SW7
PRINT
SW8
CHARACTER
R141
5600
R142
5600
R144
5600
R148
5600
R147
5600
R143
5600
R145
5600
R146
5600
5.0V
HD74S164P
Q3
SHIFT
REGISTER
GND
VCC
CLK
B
CLR
A
QH
QG
QF
QE
QD
QC
QB
QA
NC
SN74S06N
Q4
PROP
D14
YEL
D11
D15
D13
D10
QUIET
D7
R15
150
R13
100
R16
100
R14
100
R10
100
R8
150
C3
22uF
R20
51K
S9
R5
51K
S1
S6
R9
5600
S2
R4
5600
C2
100pF
HD74LS164P
Q1
SHIFT
REGISTER
SN74S06N
Q2
ALM
D2
RED
SEL
D1
UTL
D12
HSD
D8
NLQ
D9
MENU
D6
POWER
D3
R3
150
R1
150
R18
150
R12
150
R11
150
R6
150
R2
150
S5
TR1
.5V
3.9V
PHOTO CIRCUITRACE = 11
SCHEMATIC CIRCUITRACE = 11
A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE
© Howard W. Sams & Co., Inc. 1989
SP U
SP V
SP W
TAKEN IN
SELF TEST
5V
-2.5V
6V
50μs
-2V
VARIES
2.4V
SP D/A
SP ON/OFF
R51
1000
R30
220K
D114
R152
10K
R108
22K
C107
.01
R150
2000
40.1V
C103
.001
R1
.51
R106
3300
LF HOLD
TR120
R159
22K
LF OVD
TR20
R154
750
R54
10K
5.0V(A)
R153
100K
R58
5600
C59
.1
M54646P
Q10
DRIVER
VR1
VR2
PH1
PH2
T2
E2
C2
VCC1
VCC2
LF #3
LF #4
R171
2000
R170
2000
R165
47K
C166
820pF
R3
.51
R161
1000
C163
820pF
D10
D12
SP ALM
HD ALM
R33
51K
R2
2000
C8
22uF
D102
CA
CB


PART OF LXSP-2 CONTROL PANEL BOARD
HD74S164P Q3 SHIFT REGISTER
SN74S06N Q4
SN74S06N Q2
GND
VCC
CLK
B
CLR
A
QH
QG
QF
QE
QD
QC
QB
QA
NC
PROP D14
D11
D15
D13
D10
QUIET D7
YEL
R15 150
R13 100
R16 100
R14 100
R10 100
R8 150
5.0V
TER
S9
PHOTO CIRCUITRACE = 11
SCHEMATIC CIRCUITRACE = 11
ALM D2 RED
SEL D1
UTL D12
HSD D8
NLQ D9
MENU D6
POWER D3
R3 150
R1 150
R18 150
R12 150
R11 150
R6 150
R2 150
S5
TR1
.5V
3.9V
SP U
SP V
SP W
SP D/A
SP ON/OFF
LF HOLD
LF OVD
LF ø3
LF ø4
SP ALM
HD ALM
TAKEN IN SELF TEST
5V 5ms -2.5V
6V 50μs -2V
15V 5ms -5V
HA13412 IC1 DRIVER (MTDV)
+ U IN
+ V IN
+ W IN
− W IN
− V IN
− U IN
+ FG IN
− FG IN
CTRL V
REF V
VSEN
CSEN
VCC1
VCC2
SNB
U OUT
V OUT
W OUT
FG OUT
PH COMP
OC FG OUT
GND
CMP OUT
VARIES
2.4V
10.6V
1.6V
3.8V
3.1V
.2V
.1V
C10 3.3uF 100V
C103 .001
R1 .51
C11 10uF
R106 3300
D101
D2
L1
TR1 AMP
R105 3300
R101 3300
C102 10pF
R104 510
40.1V
D114
R150 2000
R152 10K
R51 1000
R30 220K
R108 22K
C107 .01
TR120
R159 22K
5.0V(A)
TR20
R154 750
R54 10K
R153 100K
R58 5600
C59 .1
M54646P Q10 DRIVER
VR1
VR2
PH1
PH2
T2
E2
C2
T1
E1
C1
MA1
MB1
MA2
MB2
R171 2000
R170 2000
R165 47K
C166 820pF
R3 .51
R161 1000
C163 820pF
C61 820pF
R60 47K
R162 1000
R4 .51
C164 820pF
D10
D12
D102
R2 2000
R33 51K
C8 22uF
TR11 SWITCH
R109 2200
TR109
R129 1200
ALM
PART OF SPACE MOTOR ASSEMBLY BOARD
M1
CN2
SBJ
øB
øA
SP ALM
OFF LINE FF PRESSED
38V 2ms 0V
M2 LINE FEED MOTOR
CN7
L3
L5
CABLING, HEAVY LINES REDUCE USE OF MULTIPLE LINES
CB

PRELIMINARY SERVICE CHECKS (Continued)



5A
1
CN5
36
Q14
12
Q13
Q12
CN6
Q7
30
1
31
Q11
50
81
51
80
2F
1
1
CN7
3B
4
Q10
PE SENSOR
2G
3D
4D
5B
MAIN BOARD
2D
CN2
1
23
1
CN1
23
1
IC1
15
IC2
RV1
5V
2 3 1 IC1
5V
10.6V
F1
2A 250V
1E
1H
CN1
1
8
11.5VAC
10.6V
0V
5V
0V
40V
D3
B C E
Q1
SCR D2
1F
D12
10.6V
D1
D11
1K
POWER SUPPLY BD
T1 POWER TRANSFORMER
CN1-1
1C
36.6VAC
1Ω
CN1-8
CN1-3
1C
15.3VAC
0.35Ω
CN1-6
CN1-4
1C
11.5VAC
2.5Ω
CN1-5
6.2Ω
120VAC
490MA
1D
1B
AC INPUT BOARD
1A
1.5A
F1
LINE FEED MOTOR
7Ω
7Ω
3C
3A
LINE FEED GEAR ASSEMBLY
PLATEN
20
HEAD TEMP THERMISTOR
400Ω NTC
4A
4D
M3 PRINT HEAD
1 2 4 6 8
9 7 5 3
1 2 3 4 5 6 7 8 9 10 11 12 NC
1 2 3 4 5 6 7 8 9,10 11 12 13 14 15
4B
PRINT HEAD CONNECTOR
NC
CARRIAGE RACK
2A
CARRIAGE MOTOR
2F
2E
20
20
20
16
17
18
1
23
1
23
1
23
4C
CARRIAGE ASSEMBLY CABLE
2C
ENCODER DISK
ENCODER SENSOR
D1
Q1
Q2
D7
SW7
D8
D12
D9
SW1 SEL
SW2 MODE
SW3 L.F.
SW4 F.F.
SW5 PARK
SW6 TOF
D10
D13
D15
CONTROL BOARD
D2 ALARM
D3 POWER
TR1
E C B
D6
Q3
Q4
SW8
D11
D14

OKIDATA
CP60
MODEL MICROLINE 320(GE5253A)

PRELIMINARY SERVICE CHECKS (Continued)
PREVENTATIVE MAINTENANCE

ENVIRONMENT

Computers perform best in a clean, cool area that is below 80 degrees Fahrenheit and free of dust and smoke particles. Even though home Computers are not affected by cigarette smoke as much as commercial Computers are affected, it is better to mantain a smoke-free area around the Computer. Do not block cabinet vents of Computer, Monitor, Printer, or other power devices.

ELECTRICAL POWER

Variations in the line voltage can affect the Computer. Try to avoid these fluctuations by using an AC receptacle that is on a power line not used by appliances or other heavy current demand devices. A power-surge protector, power-line conditioner, or non-interruptable power supply may be needed to cure the problem. **Do not** switch power On and Off frequently.

KEYBOARD

Liquids spilled into the Keyboard can ruin it. Immediately after a spill occurs, disconnect the Computer power plug from AC power outlet. Then, if circuitry or contacts are contaminated, disassemble the Keyboard and carefully rinse the Keyboard printed circuit board with distilled water and let it dry. Use a cotton swab to clean between the keys. Use a non-abrasive contact cleaner and lint-free wipers on accessible connectors and contacts.

DISK DRIVES

Clean the read/write heads of the Disk Drives about once a month or after 100 hours usage. Use only an approved head cleaning kit.

Handle carefully to preserve proper disk head alignment. A sudden bump or jolt to the Disk Drives can knock the disk head out of alignment. If Disk Drive must be transported, place an old disk in slot and close door during transport.

Store disks in their protective covers and never touch the disk surface. Observe the disk handling precautions usually found on the back of disk protective covers.

PRINTERS

Carefully vacuum the Printer regularly. Wipe surface areas clean using a light all-purpose cleaner. Do not oil the machine. The oil will collect abrasive grit and dust. The dust will act as a blanket. This can cause components to overheat and fail.

STATIC ELECTRICITY

Static electricity discharge can affect the Computer. In order to minimize the possibility, use anti-static mats, sprays, tools and materials, and maintain good humidity in the Computer environment.

MONITOR

Use an isolation transformer with any Monitor that does not come as part of the system since some Monitors use a HOT chassis (chassis connected to one side of the AC line). The face of the Monitor should never be left on for long period of time at high brightness level except when pattern is being changed periodically. Use caution when cleaning anti-glare screens, to preserve the glare-reduction feature.

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool which is designed for quick isolation and repair of Printer system malfunctions.

Check all interconnecting cables for good connection and correct hook-up before making service checks.

Always turn Printer Off before connecting or disconnecting connectors.

Replacement or repair of the Power Supply, Main Board, Control Board or connectors may be necessary after the malfunction has been isolated.

TEST EQUIPMENT

Digital Volt/Ohm Meter
Logic Probe

TOOLS

Head Cleaning Equipment (Ethyl Alcohol)
Contact and Switch Cleaner (non-spray type)
Phillips Screwdriver
Flat-Blade Screwdriver
IC Insertion and Removal Tools 28 pin
Low Wattage Soldering Iron
Desoldering Equipment
Feeler Gauge
Tension Gauge

CP60 MODEL MICROLINE 320(GE5253A) OKIDATA

SAMS™ **Howard W. Sams & Co.**
4300 West 62nd Street, P.O. Box 7092, Indianapolis, Indiana 46206 U.S.A.

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co. as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co. by the manufacturers of the particular type of replacement part listed.

89CP19095 DATE 11-89

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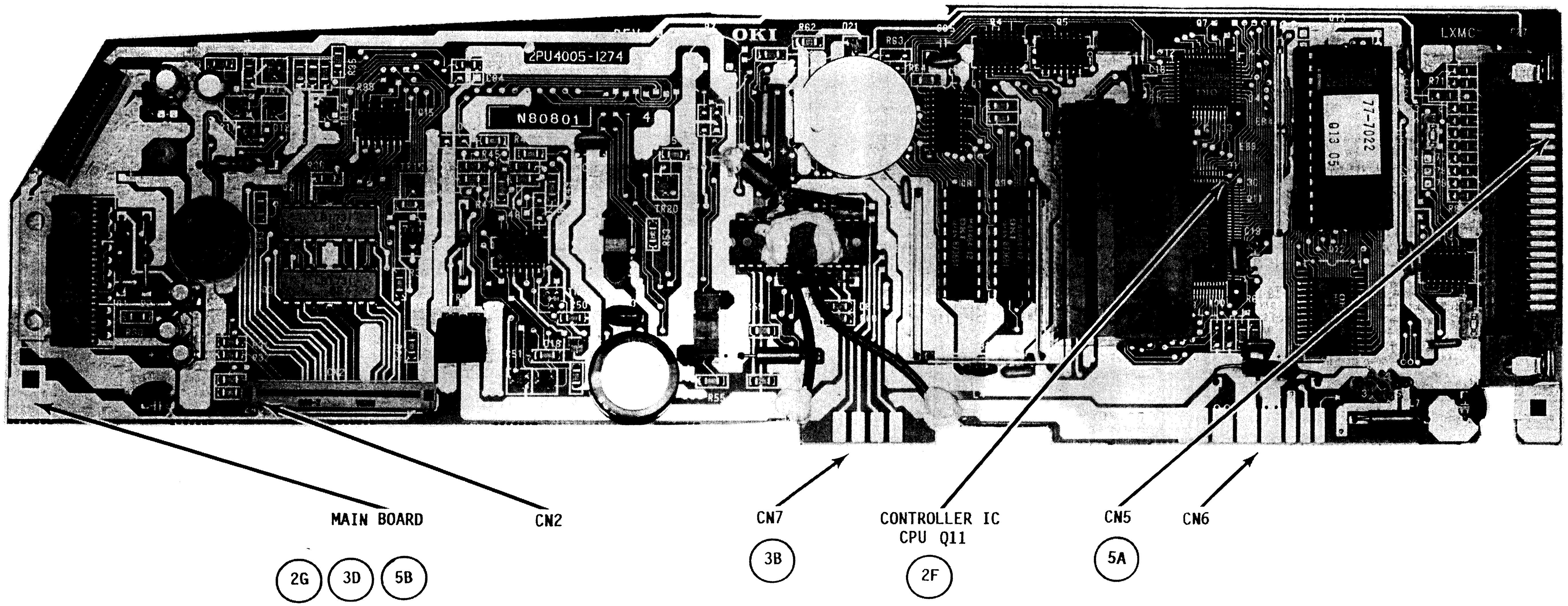
Printed in U.S. of America

PRELIMINARY SERVICE CHECKS (Continued)


MAIN BOARD
2G
3D
5B
CN2
CN7
3B
CONTROLLER IC
CPU Q11
2F
CN5
5A
CN6
OKI
2PU4005-1274
N80801
77-7022
LXMC

PRELIMINARY SERVICE CHECKS (Continued)

GENERAL OPERATING INSTRUCTIONS

OPERATION OF THE CONTROL PANEL

The front Control Panel can be used to change the basic features of each document, and can alter the default settings. It also can be used to configure the printer for different computer systems.

BASIC CONTROLS

SEL Button	Push to select or de-select the printer.
SEL Light	The SEL Light will be On when the printer is selected and ready to receive data. The SEL Light is OFF when the printer is de-selected and cannot receive data.
Power Light	Indicates that the printer is turned On.
Alarm Light	Turns On when paper is out or when there may be a hardware problem requiring service.
Mode Button	Selects between Print Mode and Menu Select Mode. The mode button controls the functions of the next four buttons. Each of these buttons have two functions, one printed above the control and the other printed below the control. When the printer is in Print Mode the functions shown above the buttons are active. When the printer is in Menu Select Mode the functions below the buttons become active.

FUNCTIONS OF THE FOUR BUTTONS

PRINT MODE

1. Line Feed Button - Press to advance paper One line.
2. Form Feed Button - Press to advance paper to the first print line of the next page.
3. Park Button - This button is used to retract continuous forms to use the single sheet setting.
4. TOF/QUIET Button - With the printer de-selected press to set the position of the first print line on the page as "Top of Form." With the printer selected press to enter the Quiet Mode (Quiet light will turn On) to reduce noise.

PRINT QUALITY

Press the Print Quality button to select: HSD (High Speed Draft), NLQ (Near Letter Quality), or UTL (Utility). Respective indicator light will illiminate with selection.

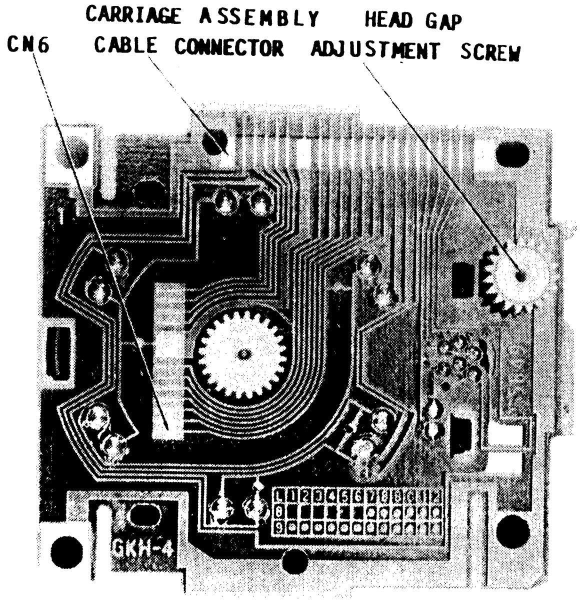
CHARACTER PITCH

Press the Character Pitch button to select number of characters per inch. Select from 10, 12, 17, 20 or proportionally spaced characters. Proportionally spaced characters not functional while in Print Quality HSD mode. Respective indicator light will illuminate with selection.

MENU SELECT MODE

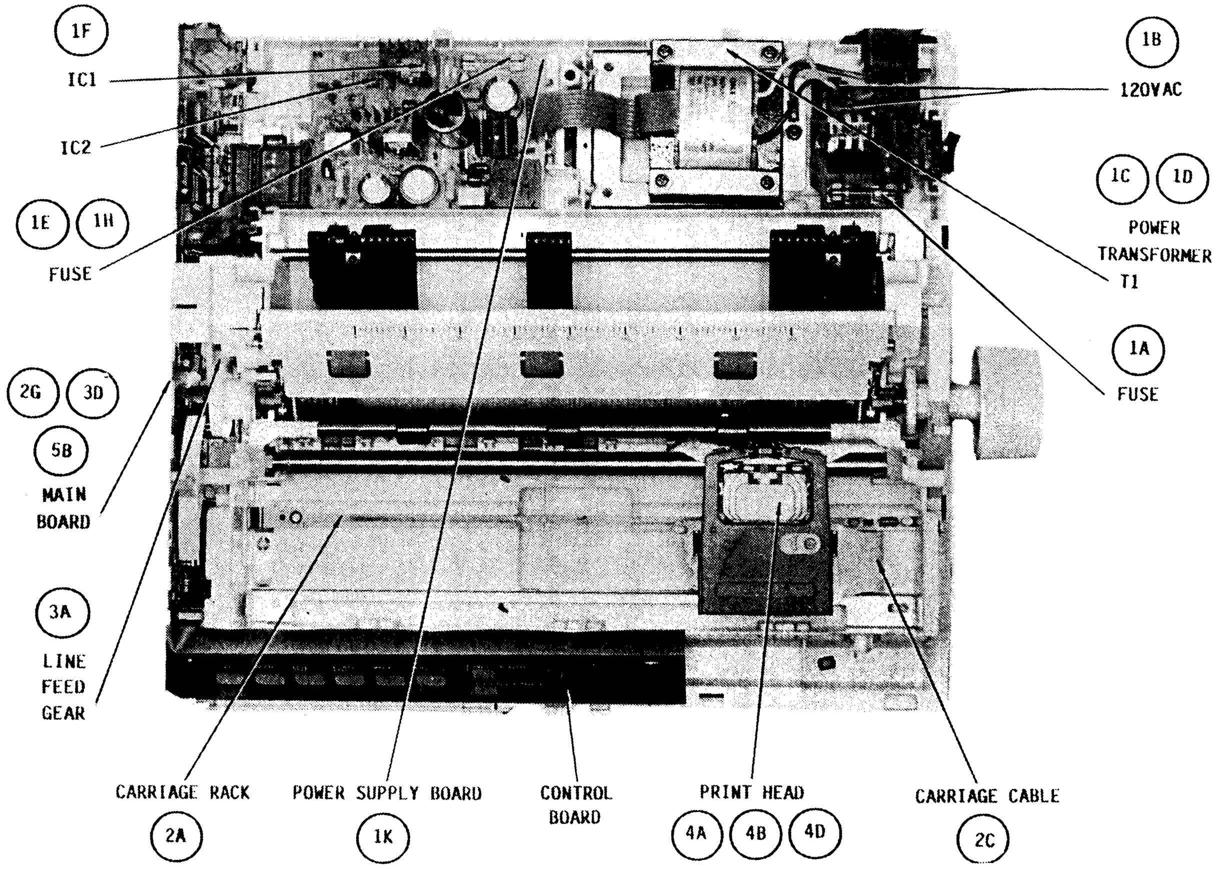
The selections on the menu can be stored in the printer memory and become the default settings, although they can be changed through software commands, control panel or resetting the menu. Respective indicator lights will illuminate with menu settings.

1. Group button - Press to select group of items.
2. Item button - Press to select item from selected group.
3. Set button - Press to set item from selected group.
4. Print button - Press to print full list of current menu settings.

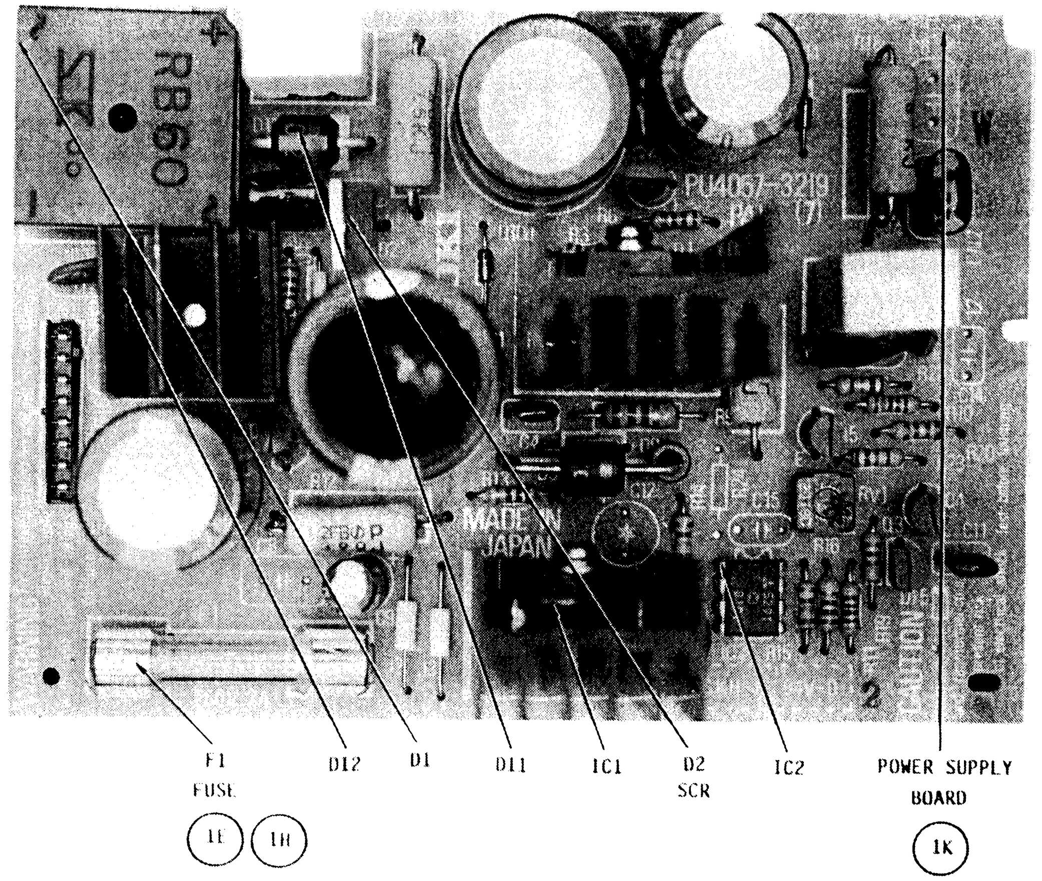

CARRIAGE ASSEMBLY
CN6
CABLE CONNECTOR
HEAD GAP
ADJUSTMENT SCREW

SPACE (CARRIAGE) MOTOR BOARD

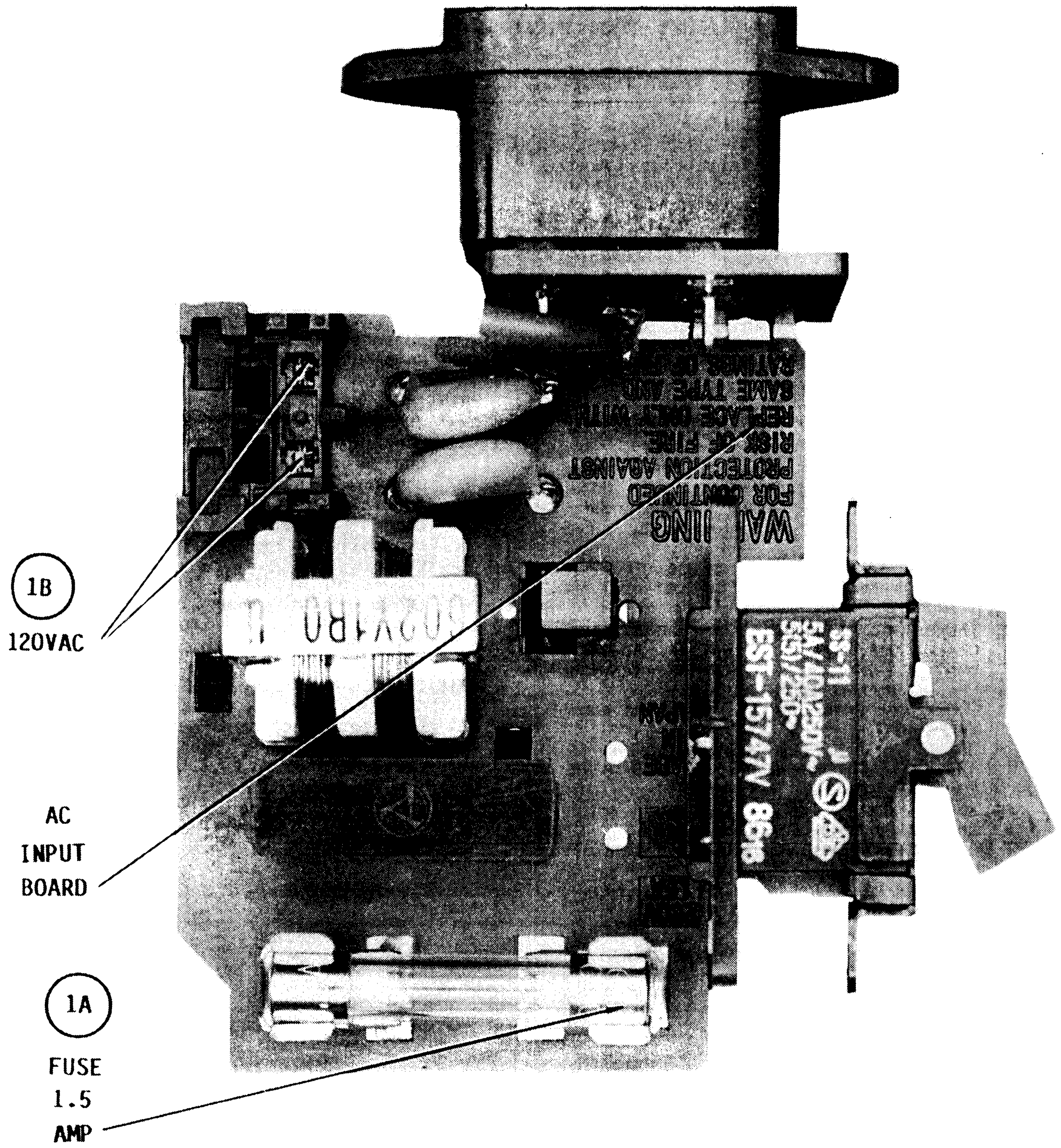
PRELIMINARY SERVICE CHECKS (Continued)


1F
IC1
IC2
1E
1H
FUSE
2G
3D
5B
MAIN BOARD
3A
LINE FEED GEAR
1B
120VAC
1C
1D
POWER TRANSFORMER T1
1A
FUSE
CARRIAGE RACK
2A
POWER SUPPLY BOARD
1K
CONTROL BOARD
PRINT HEAD
4A
4B
4D
CARRIAGE CABLE
2C

CHASSIS-OVERALL VIEW


F1
FUSE
1E
1H
D12
D1
D11
IC1
D2
SCR
IC2
POWER SUPPLY BOARD
1K

POWER SUPPLY BOARD



AC INPUT BOARD

DISASSEMBLY INSTRUCTIONS

UPPER COVER ASSEMBLY

Remove Access Cover and Platen Knob. Insert the blade of a flat screwdriver through the three slots in the main frame at the bottom of the front end and disengage the tabs of the upper cover. Lift the front of the upper cover, detach the cover by pushing backward, then lift the cover out of the printer.

CONTROL BOARD

Remove the upper cover assembly, push the tabs holding the Control Board. Remove the Control Board from the main frame and detach the board from the connector on the main board.

MAIN BOARD

Remove the Control Board, turn the locking post 90° clockwise to unlock it. Push the clamp holding the top of the Main Board upward and pull the Main Board to the left. Tilt the Main Board 45° outward, then lift upward. Disconnect the print head cable from the Main Board at connector CN2.

POWER SUPPLY BOARD

Remove the Upper Cover Assembly. Disconnect the transformer cable from connector CN1 on the Power Supply Board. Release the power Supply Board from the tab on the right side. Lift the board from the right side and pull it out of the Power Interconnect Module.

POWER TRANSFORMER

Remove the Upper Cover Assembly. Disconnect the cable from the power Supply Board and the cable from the AC Input Board. Remove one screw and ground wire. Insert the blade of a flat screwdriver into a slot on the bottom of the Lower Cover Assembly to push the lock spring of the Power Transformer. Lift the Power Transformer out of the Lower Cover Assembly.

AC INPUT BOARD

Remove the Upper Cover Assembly, disconnect the Power Transformer cable from the AC Input Board. Remove one screw and ground wire from the power Transformer base. Detach a locking tab on the bottom of the main frame. Lift the AC Input Board out, notice that the AC Line Inlet and the Power Switch are attached to the AC Input Board.

RIBBON DRIVE GEAR ASSEMBLY

Remove the Upper Cover Assembly, remove the Ribbon Cassette. Using a flat blade screwdriver push the two front tabs and then the two rear tabs, then pull upwards and remove the Ribbon Feed Gear Assembly.

CARRIAGE MOTOR ASSEMBLY

Remove the Upper Cover Assembly, remove the Ribbon Cassette. Remove the Print Head. Unlock four tabs to detach the Ribbon Feed Gear Assembly. Remove the Head Cable, Cable Clamp and the Contact Pressure Rubber from the Carriage Motor Assembly. Remove three screws and lift the Carriage Motor Assembly from the cabinet.

CARRIAGE RACK

Remove Carriage Motor Assembly, remove spring from right end of Carriage Rack. Carefully pry left end of Carriage Rack off the printer cabinet. Remove the Carriage Rack.

PLATEN ASSEMBLY

Remove the Upper Cover Assembly. Remove the Ruler Guide by tilting it backward. Move the Ball Arm toward the front of the printer. Push the Release lever to its rear position. Pull the Lock-levers upwards. Remove the Platen Assembly from the main frame.

RIBBON PROTECTOR

Remove the Print Head, remove the Platen Assembly and remove the Head Clamp. Move the Ball Arm toward the front of the printer. Pull the Ribbon Protector upward from the carriage frame.

LINE FEED MOTOR

Remove the Main Board. Remove the Platen Assembly. Remove the board lock which is positioned above the line Feed Motor. Using a flat blade screw driver open the lock lever and push the bracket of the Line Feed Motor outward to the left. Remove the Line Feed Motor from the guide holes in the frame.

PRESSURE ROLLER ASSEMBLY

Remove the Platen Assembly. Take out the Paper Chute. Detach the Reset Spring by pushing the horizontal part down at the center of the spring while pulling the spring out to the right of the printer to remove it. Remove the Change Gear and the Idler Gear. Remove the Pressure Roller Assembly from the main frame.

TRACTOR ASSEMBLY

Remove the Pressure Roller Assembly, then remove the Tractor Gear from the drive shaft of the Tractor Assembly. Lift the Drive Shaft and slide it to the right until its left end is exposed from the guide hole. Remove the lock shaft from the right guide. Slide the Tractor Frames ot of the two shafts. When reinstalling align the Pin Tractor Wheels on both tractor frames left and right.

PRELIMINARY SERVICE CHECKS (Continued)

MISCELLANEOUS ADJUSTMENTS

HEAD GAP ADJUSTMENT

Set Adjustment Lever to Range 1, see Figure 1. Set Paper Lock/Release Lever to lock position. Use a feeler gauge and measure for 0.018 inches ±.002 between Print Head and Platen. If measurement is not correct, depress gear On Adjustment Screw and adjust Screw until gap between Platen and Print Head is correct. Check the gap for .028 ± .002 inch with the adjusting lever at range 3.

CARRIAGE RACK/ROLLER ADJUSTMENT

Use a feeler gauge and measure for 0.004 inches ±0.002 between Roller and Carriage Rack, see Figure 2. If measurement is not correct, loosen Carriage Motor mounting screw, see Figure 3, and reposition Carriage Motor Assembly until measurement is correct. After the adjustment, attach a tension gauge to right side of Ribbon Feed Gear Assembly and ensure Carriage travel load (without Ribbon Cartride) is less than 0.33 lbs, see Figure 3 and Figure 4.

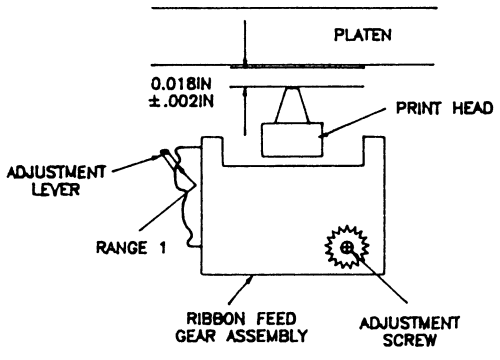

PLATEN
0.018IN
±.002IN
PRINT HEAD
ADJUSTMENT LEVER
RANGE 1
RIBBON FEED GEAR ASSEMBLY
ADJUSTMENT SCREW

FIGURE 1

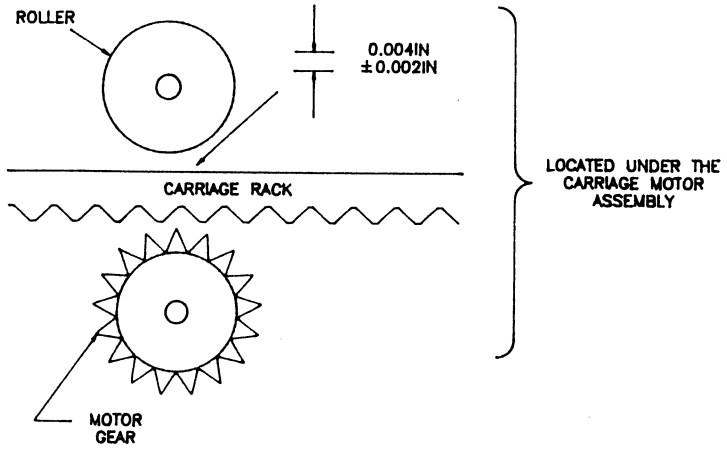

ROLLER
0.004IN
±0.002IN
CARRIAGE RACK
MOTOR GEAR
LOCATED UNDER THE CARRIAGE MOTOR ASSEMBLY

FIGURE 2

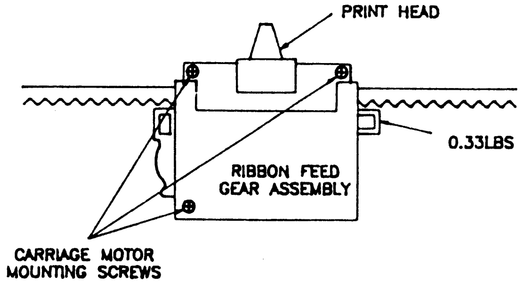

PRINT HEAD
0.33LBS
RIBBON FEED GEAR ASSEMBLY
CARRIAGE MOTOR MOUNTING SCREWS

FIGURE 3

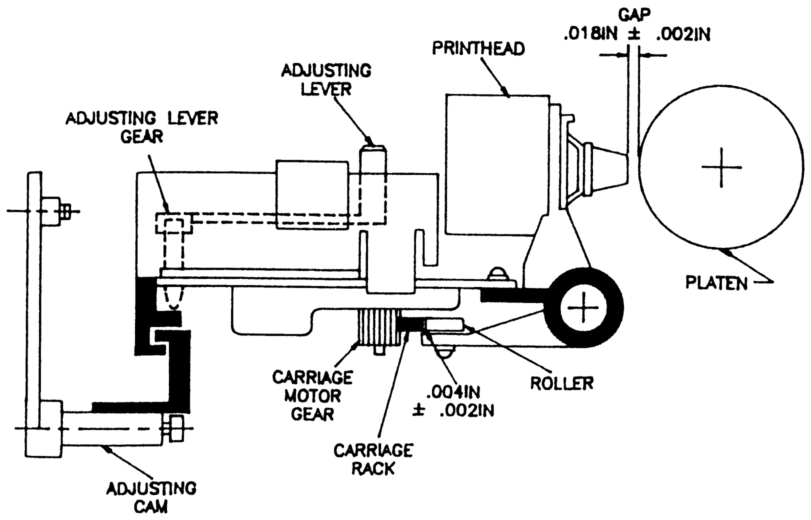

GAP
.018IN ± .002IN
PRINTHEAD
ADJUSTING LEVER
ADJUSTING LEVER GEAR
PLATEN
CARRIAGE MOTOR GEAR
.004IN
± .002IN
ROLLER
CARRIAGE RACK
ADJUSTING CAM

FIGURE 4

PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

MATCH THE NUMBERS ON THE INTERCONNECTING DIAGRAM AND PHOTOS WITH THE NUMBERS ON THE SERVICE CHECKS TO BE PERFORMED.

① PRINTER DEAD

(A) Check AC Fuse (F1) on AC Input Board.
(B) Check for 120 VAC across Power Transformer primary winding. If voltage is missing, check AC Input Board by substitution.
(C) Check for 36.6VAC between pins 1 and 8, 15.3VAC between pins 3 and 6 and 11.5VAC between pins 4 and 5 of connector CN1. If any voltage is missing, check Power Transformer by substitution.
(D) Check the resistances of the windings of the power transformer, check the power transformer by substitution.
(E) Check Power Supply Board Fuse (F1).
(F) Check for 10.6V at the cathode of bridge rectifier D12.
(G) Check for 5V at pin 1 of regulator IC (IC2).
(H) If the 10.6V is missing, check Fuse F1, 5V Regulator IC1 and IC2.
(K) Check the power Supply Board by substitution.

② PRINTER CARRIAGE ASSEMBLY FAILS TO MOVE OR MOVES ERRATICALLY.

(A) Inspect Carriage Rack for damage.
(B) Check Carriage Rack/Roller Adjustment.
(C) Check Carriage Cable.
(D) Check connector at CN2 for good connection.
(E) Check for 20 ohms between pins 16 and 17 and between pins 17 and 18 of Carriage Cable. If resistance is not correct, check Carriage Motor Assembly by substitution.
(F) Manually move carriage assembly and check for pulses on pins 79 and 80 of Controller IC (Q11). If pulses are missing, check Carriage Motor Assembly by substitution.
(G) If pulses are present check the Main Board by subsitution.

③ LINE FEED MOTOR MALFUNCTIONING

(A) Check Gear Assembly.
(B) Check contacts to the Main Board at connector CN7.
(C) Check for 7 ohms between pins 1 and 2 and between pins 3 and 4 of connector CN7. If resistance is not correct, check Line Feed Motor (M2) by substitution.
(D) Check Main Board by substitution.

④ PRINT HEAD MALFUNCTIONING

(A) Check Print Head face for damage or contamination.
(B) Check Print Head connector on Carriage Assembly.
(C) Check connector CN2 for good connection and Carriage Assembly Cable.
(D) Remove Print Head from Printer and check Print Head resistance, if resistance is not correct, replace Print Head.

⑤ PRINTER WILL NOT RECEIVE DATA

(A) Check connector CN5 and interface cable.
(B) Check Main Board by substitution.

OKIDATA MODEL MICROLINE 320(GE5253A)

CP60

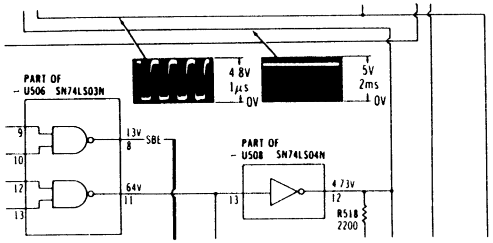
HOWARD W. SAMS & COMPANY

Remove staples and use cover for file folder.

COMPUTERFACTS put easy to use, informative technical data right at your fingertips. Each edition includes specific service information on the individual component, along with some overall troubleshooting hints.

The following information is just a sample of the many valuable time saving features contained in this exclusive Sams COMPUTERFACTS publication:

- Preliminary Service Checks section is an easy to use, step by step guide for the experienced technician or hobbyist, and even beginners.
- SAMS famous industry accepted standardized notation schematics containing CIRCUITRACE® , GRIDTRACE™, waveforms, voltages and stage identification.

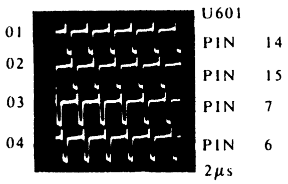


- Step by Step Troubleshooting guides the technician through the necessary procedures to quickly locate the problem.

TROUBLESHOOTING

MICROPROCESSOR CHIP (CPU) OPERATION

Verify the processor is functioning by checking the signals on the address lines (pins 10 thru 24 of IC U600) and the data lines (pins 41 thru 56) using a logic probe or a scope if a logic probe is used, refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address lines (except pins 22 and 23 which have no signal in Power Up mode) should be similar to Figure 1. The waveforms on the data lines should be similar to Figure 2.

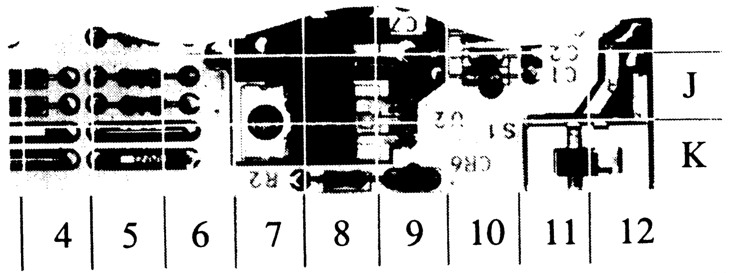


- Logic Chart containing logic probe readings to isolate defective circuitry and components.

LOGIC

PIN NO	IC U100	PIN NO	IC U100	PIN NO	IC U102	IC U103	IC U104	IC U105	IC U106	IC U107	IC U108	IC U109
1	P	21	P	1	L	L	L	L	L	L	L	L
2	P	22	P	2	P	P	P	P	P	P	P	P
3	P	23	P	3	H	H	H	H	H	H	H	H

- Quick Component Location using the SAMS exclusive GRIDTRACE, CIRCUITRACE, and component photographs.



- Complete Components Parts List in an easy to use format with field replacements shown when possible. SAMS unique semiconductor, chip and IC cross-reference gives you many replacements to choose from and is available at your Electronic Distributor.

SEMICONDUCTORS (Select replacement for best results)

			REPLACEMENT DATA				
ITEM No.	TYPE No.	MFGR. Part No.	ECG Part No.	NTE Part No.	RCA Part No.	ZENITH Part No.	NOTES
D102	1SS53	1149-2576	ECG519	NTE519	SK9091/177	103-131	
D103	2N60FM	1149-2527	ECG109	NTE109	SK3088	103-Z9001	
D201	1N4004GP	1201-4205	ECG116	NTE116	SK3312	212-76-02	
D501 thru D503	1SS53	1149-2576	ECG519	NTE519	SK9091/177	103-131	

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